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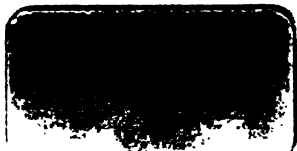
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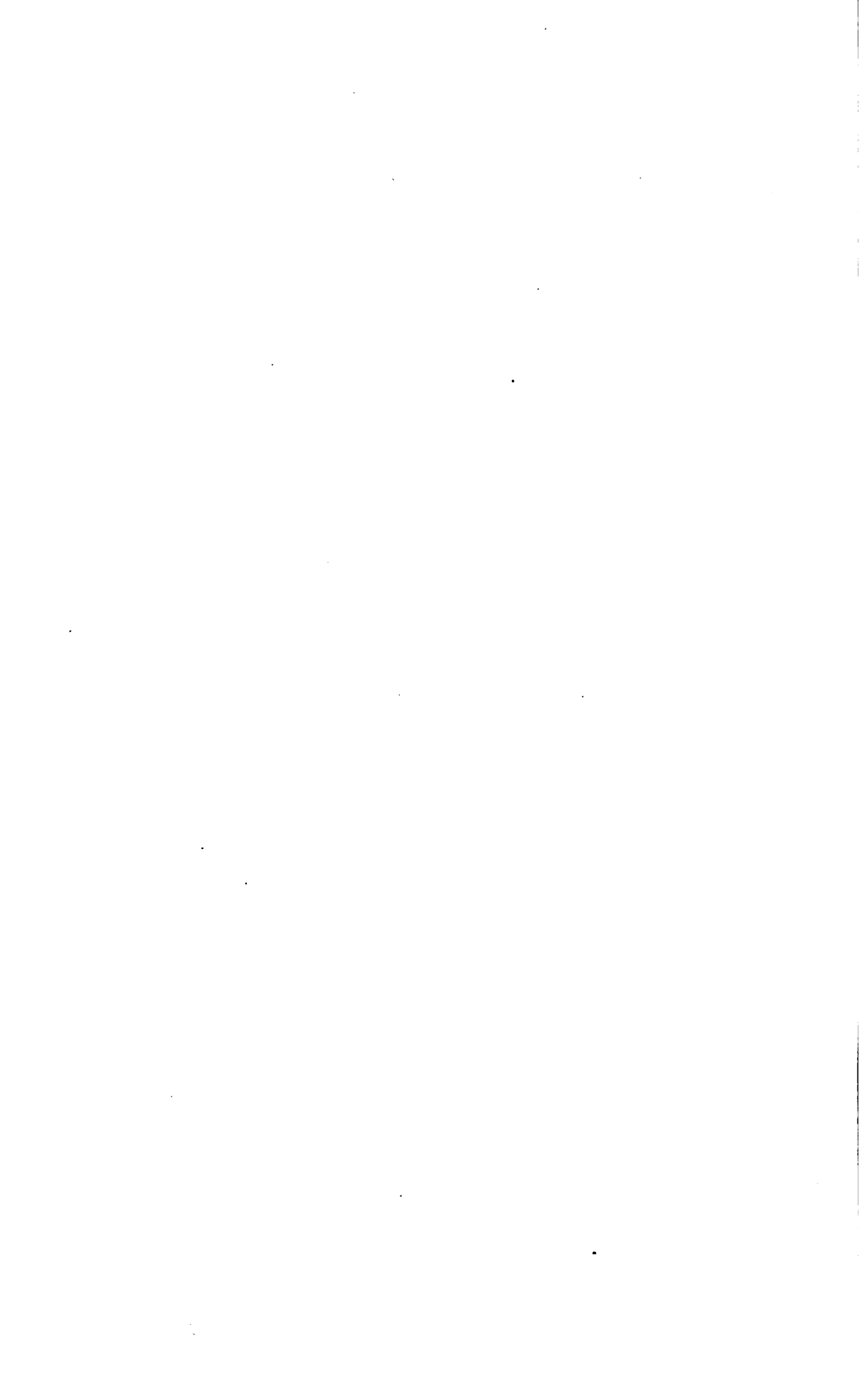
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from the author.









**A TREATISE**  
**ON**  
**TUBERCULAR PHTHISIS,**  
**OR**  
**PULMONARY CONSUMPTION.**

**BY**  
**JAMES CLARK, M.D. F.R.S.**

**PHYSICIAN IN ORDINARY TO THEIR MAJESTIES THE KING AND QUEEN OF THE BELGIANS.**

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*From the Cyclopædia of Practical Medicine.*

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## TUBERCULAR PHTHISIS.

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TUBERCULAR PHTHISIS, OR CONSUMPTION, PHTHISIS TUBERCULOSA, PHTHISIS PULMONALIS.

The term phthisis (*φθισις*, from *φθίω*, *corumpo*, *consumor*, to waste, or decay) was introduced into medicine when there existed little precise knowledge of the morbid condition upon which the emaciation and other characteristic symptoms of the disease depended. It was first used as a generic term to signify consumption of every kind, and was afterwards more distinctly specified according to the organ in which it was supposed to originate, as phthisis pulmonalis, phthisis hepatica, phthisis mesenterica, &c.; indeed it has even been applied to the wasting attendant on various diseases, as phthisis rheumatica, phthisis syphilitica, phthisis scorbutica, and many others. These indiscriminate appropriations of the term gave rise to much vagueness and confusion in its practical application. But as the knowledge of morbid anatomy became more precise, disease of the lungs was found to be most frequently connected with consumption; and hence phthisis pulmonalis not only attracted far greater attention than any other form of the disease, but a large proportion of the other species were found to resolve themselves into this, having been discovered to be mere complications of it. Phthisis pulmonalis was now divided into various species, according to the real or imaginary nature of the pulmonary disease upon which the symptoms were supposed to depend.

At length, Laennec, finding, in the course of his extensive researches into pulmonary diseases, that tubercles formed almost the universal cause of consumption, proposed to restrict the term phthisis to the disease produced by tubercles in the lungs; and since the publication of his great work in 1819, (an important era in our knowledge of pulmonary diseases,) the term has been so restricted in France. The accuracy of Laennec's opinions has been confirmed by the subsequent investigations of Louis and Andral, whose minute and laborious researches have given a precision to our knowledge of the

subject which was unknown before their time. But, notwithstanding the advantages which have resulted from the adoption of these views, they have tended to keep alive the idea that pulmonary phthisis is a local disease, referrible to a local cause: and thus the constitutional origin of tubercles, by far the most important part of the subject, has been neglected.

Before we can hope to acquire an accurate knowledge of consumption, we must carry our researches beyond those morbid alterations which constitute the pulmonary disease and are only a secondary affection,—the consequences of a pre-existing constitutional disorder, which is the necessary condition that determines the production of tubercles.

An imperfect acquaintance with the nature of tubercles and with the morbid state of the system in which they have their origin, has led to great discrepancy of opinion concerning the nature and causes of phthisis pulmonalis. There are many, even at the present day, who regard tuberculous disease of the lungs as the result of inflammation; an opinion which we consider as not only erroneous, but as having been productive of a very mischievous practice. Inflammation of the respiratory organs may, and we believe often does give rise to tubercles, and unquestionably accelerates their progress; but we also believe inflammation to be incapable of producing tubercles in a healthy constitution.

Chronic inflammation of the different tissues of which the lungs are composed, is often accompanied with symptoms closely resembling those produced by tuberculous disease. Chronic bronchitis and chronic pleurisy afford examples of this kind; and the distinction between these and tuberculous disease of the lungs, becomes, in some cases, very difficult. Hence they have been, and still are often confounded, and considered, as regards each other, in the light of cause and effect. This error originates not in the nature of the subject, but in a want of correct observation; and we are of opinion that when the history of these inflammatory affections is carefully investigated, they may, in a very large proportion of cases, be discri-

minated from pure tuberculous disease. That the distinction is not more frequently made is owing more to our own imperfect and careless inquiries into the history of the cases which come before us, and to our negligence in examining minutely all the signs and symptoms which they present, than to any real obscurity in the nature and characters of the diseases themselves. The truth is, that in the highly tuberculous constitution, tuberculous disease of the lungs very often occurs in a slow, insidious manner, and, in a large proportion of such cases, has made considerable progress before it manifests itself by any remarkable local symptoms, or is even suspected to exist by those who regard consumption as originating in inflammatory diseases of the lungs. In such examples of latent tuberculous disease, an attack of catarrh, a slight inflammation of the pleura or of the lungs, or hæmoptysis, is not unfrequently the first circumstance which excites the attention or awakens the fears of the patient and his friends; and to this accidental occurrence, to which the presence of tubercles in the lungs renders the person peculiarly liable, the origin and cause of all the future mischief is attributed. Nor is it surprising that an ordinary observer should arrive at such a conclusion; and, ascribing the disease to that which was first cognizable by his senses, should consider the "neglected cold," the "inflammation of the lungs," or the "breaking of a bloodvessel," the original cause of all the subsequent evil. But, after all the light which modern pathologists have thrown upon the nature, the diagnosis and prognosis of tuberculous disease, it may well excite surprise that medical men should still regard these affections as the chief causes of Phthisis. In a vast proportion of cases of this nature, a more minute inquiry into the patient's previous state of health, and a closer investigation of the symptoms, would have led to the conviction that long before the pneumonia, the hæmoptysis, or even catarrh, tuberculous disease of the lungs existed, and that those affections were consequent upon, or at least subsequent to, the existence of pulmonary tubercles, or had occurred in a tuberculous constitution by which their effects were modified. In another part of this article we shall state the grounds upon which this opinion rests, and at the same time endeavour to show that tuberculous disease of the lungs may be detected long before it generally is;—that what is usually considered the early is in reality an advanced stage of the disease;—and that tubercle, even in its nascent state, is, as has just been stated, a secondary affection, originating in, and dependent upon, a morbid condition of the general system, viz. tubercular cachexia.

Our principal object in this article is to take a comprehensive view of tuberculous phthisis as originating in a morbid state of the constitution; to inquire into its nature, origin, and causes as an hereditary affection; to point out those circumstances which are capable of inducing it at the different periods of life; and to attach the proper value to those pulmonary

diseases which are considered by some as the real causes of consumption, but by others, more correctly in our opinion, as merely determining causes, and often only complications. If we succeed in giving a satisfactory exposition of this, the most important, but hitherto most neglected part of our subject, we may hope to lay the foundation of a sounder pathology of tuberculous disease, and to establish a more rational and more effectual mode of prevention and treatment during that period of its progress in which medical treatment is of much avail, and a cure can be considered possible. For no physician, acquainted with the morbid anatomy of phthisis, can for a moment indulge the hope that we shall ever be able to cure what is usually termed "confirmed consumption," if we except the small proportion of cases in which the tuberculous deposit is confined within narrow limits. The state of the lungs in the advanced stage of phthisis is to be regarded as the result of a series of morbid processes which have terminated in the destruction of the organ; and we might as reasonably expect to restore vision when the organization of the eye is destroyed, or the functions of the brain when the substance of that organ is reduced by disease to a pulaceous mass, as to cure a patient whose lungs have been extensively destroyed by tuberculous disease. "*Quelle est la maladie qu'on guérit,*" asks Portal, "*quand l'organe dans laquelle elle réside a souffert une désorganisation complète?*"

Had the labour and research that have been wasted in fruitless experiments to cure an irremediable condition of the lungs been directed to the discovery of the causes and nature of tuberculous disease, with the view of deducing rules for its prevention and treatment, consumption would be regarded in a light very different from that in which it is looked upon at the present period. Our view of tuberculous consumption comprehends not merely the period succeeding the actual development of pulmonary tubercles, but the whole course of the disease from the very commencement of the constitutional disorder. By a knowledge of this constitutional disorder, we may reasonably hope to prevent, in many cases, the occurrence of the disease, and, in a small proportion, to arrest its progress in its nascent state and even to remove its local effects: and if we go a step further back, and investigate the causes which give rise to the tuberculous diathesis in the parent, we may also hope to diminish the hereditary disposition in the offspring. This is, no doubt, opening a very wide field of inquiry; but it is most certain that, unless we enter into the subject in its fullest extent, we shall do little effectual towards diminishing the frequency, or reducing the mortality of this very prevalent and most destructive malady.

It is not, we believe, advancing too much when we state that, among the whole range of human infirmities, tuberculous diseases are the most deserving the study of the physician, whether we regard their immense

frequency or appalling mortality. Confined to no country, age, sex, or condition of life, they destroy a larger proportion of mankind than all other chronic diseases taken together. In this country, and over the whole temperate region of Europe and America, tuberculous disease of the lungs causes probably a fifth part of the whole mortality; and in some districts, and even in whole countries, the proportion is much larger. It has been calculated by the late Dr. Young, Dr. Woolcombe, and others, from the best data which the bills of mortality afford, that in Great Britain and Ireland, consumption causes one fourth part of the deaths that occur from disease. If, then, we add to consumption, tuberculous disease of the glandular system, of the brain, of the large joints, of the spinal column, &c. and deduct the mortality which occurs during the first months of life, we shall probably be within the truth in stating that one third part of the mortality of this country arises from tuberculous diseases: and if to this frightful destruction of mankind we add the numerous crippled and disfigured sufferers whom we daily meet with, the blind, the deaf, and the maniacal, (for mania is not an infrequent consequence of this disease,) and, above all, the painful reflection that the predisposition to this destructive class of maladies is transmitted from the parent to the offspring,—we shall surely have no need to press upon medical practitioners the claim which tuberculous disease has, above all others, upon their earnest consideration.

A very important question in the history of tuberculous diseases naturally presents itself to our consideration in this place, viz. their increasing or decreasing frequency. Every member of the profession has too ample opportunities of satisfying himself of the extensive prevalence of strumous diseases; but some doubts may exist as to their being comparatively more prevalent at the present time than they were some fifty or a hundred years ago. By the bills of mortality, it would appear that the number of deaths from consumption in this country is less at present than thirty years since;\* but the known inaccuracy of records of this kind should render us cautious in giving too implicit faith to conclusions drawn from such sources. The labouring classes of the population in this country are at present in a more comfortable state than they were half a century back: they fare better, are better clothed, and more comfortably lodged;—circumstances which are all favourable to health, and consequently to the diminution of tuberculous disease. Although we can in these circumstances perceive a probable cause of such diminution of tuberculous disease in the lower orders, we confess we have our doubts whether their more general indulgence in the use of ardent spirits has not prevented such abatement. But whether tuberculous diseases have diminished or not during the last half

century among the labouring part of our population, we are of opinion that they have increased in the upper and middle ranks of society. This is an inquiry of great moment. If it were clearly shown that the disease is gradually abating among all ranks of the people, we might perhaps leave it in the hope that its diminution would keep pace with the improvement of society. But if, on the contrary, we arrive at the conclusion that scrofulous disease is on the increase, or, in other words, that the health of the middle and upper ranks of society is progressively declining, we shall have the strongest reasons for inquiring into the causes which lead to such deterioration of health, with a view to obviate it.

That a general delicacy of constitution and a proneness to scrofulous diseases are on the increase, is a conclusion, the accuracy of which we leave to be decided by the experience of the profession. We have all an opportunity of observing and comparing the state of health of the rising generation with that of their fathers and grandfathers. On taking a survey of the constitution of these three generations, we think it will be found, in a large proportion of instances, that the deterioration of health is progressive from father to son. We are far from believing that this is invariably the case; but we do believe that it will be found generally so: at least, such is the conclusion to which we have been led from personal observation.

It is unnecessary in the present article to enter upon the consideration of the whole series of tuberculous diseases, as part of the subject has been already treated in this work. (See SCROFULA, TABES MESENTERICA, and more particularly the admirable article TUBERCLE.) But, although our chief object will be to enter more particularly into the history of pulmonary tubercle, our observations will apply to the whole class of tuberculous affections, more especially when treating of the nature, the causes, and treatment of the disease.

#### SECT. II.—OF THE TUBERCULOUS CONSTITUTION AND TUBERCULOUS CACHEXIA.

As we shall have frequent occasion, in the course of the present article, to refer to that morbid condition of the system which precedes and attends tuberculous disease, we shall commence by giving a brief view of the characters by which it may generally be recognised. It is right, however, to premise that these are so variously influenced by the age, complexion, temperament, and other circumstances of the individual, that it is a matter of considerable difficulty to describe them. It must also be observed that this morbid condition itself is progressive, and therefore varies in intensity.

The tuberculous constitution, when of hereditary origin, is manifested by a peculiar appearance of the countenance, by the form and development of the body, by the anomalous state of various important functions, and by a peculiar disposition to certain diseased actions. The aspect of the countenance generally affords decisive indications of the presence of the affection: in early childhood it has a pale, pasty appearance, the cheeks are generally full and

\* Elements of Medical Statistics, by F. Bisset Hawkins, M.D.



the upper lip and *alæ nasi* large. If the complexion be dark, the colour of the skin is generally sallow; if fair, it has an unnatural white appearance, resembling blanched wax rather than healthy integument; and the veins are large and conspicuous. At a more advanced period of youth, the indications exhibited in the countenance are more clearly marked. The eyes, particularly the pupils, are generally large, the eye-lashes long; and there is usually a placid expression, often great beauty of countenance, especially in persons of a fair, florid complexion. On the other hand, the features are generally less regular in those of a dark complexion, and the skin is commonly coarse and of a sallow dingy colour; although there are many exceptions to this, in the fine dark eye, regular features, and delicate skin of such persons. Still, it is difficult to describe with accuracy the tuberculous physiognomy, as it varies in every intermediate shade, between the pale, faded, but changing colour of persons little under the influence of this morbid condition, and the peculiar cast of countenance which attends the confirmed cachectic state.

In early infancy there is little remarkable in the form of the body; it is generally large, but wants the firmness of health. As the child increases in age, we find for the most part that it is not well proportioned; the different parts are rarely in keeping, and there is a want of symmetry in the whole. The head is often large, the trunk small, the abdomen tumid, and the limbs are unshapely, being either large and clumsy, or disproportionately slender with large joints: but this is only the case in the more perfect examples of the tuberculous constitution. The growth of the body is also generally unsteady in its progress; very frequently it is slowly and imperfectly developed: it may increase for a time in the usual manner, and then remaining stationary for years, again proceed, especially towards puberty, with extraordinary rapidity. This last circumstance in the growth of all young persons, but more particularly in the tuberculous, is frequently observed after any acute disorder, such as fever, measles, &c.

The functions most evidently deranged are those more immediately connected with nutrition, particularly those of the digestive organs. The dyspepsia of the scrofulous constitution has peculiar characters by which it may generally be known. These have been accurately described by Dr. Todd in the article *INDIGESTION*, (vol. ii. p. 654,) under the name of *strumous dyspepsia*, a condition of the digestive organs which is not only present in the hereditary strumous constitution, but is capable, we believe, of generating this constitution and of leading ultimately to tuberculous cachexia. In Dr. Todd's opinion, "it presents a more characteristic feature of this habit of body than any physiognomical portrait which has yet been drawn of it. In this respect it is more to be depended on than either the fine skin, the clear, delicate complexion, the light hair, large blue eyes, and

dull sclerotica of one variety; or the foul, dull, swarthy-coloured skin, the sallow complexion and swollen countenance, the dark hair, and tumid upper lip of the other." Again, "upon whatever temperament the disordered habit which we call scrofula may engraft itself, we venture to say that this form of dyspepsia will also there be found; and, therefore, being constantly present with it, preceding and accompanying the various symptoms which issue from it, it would be contrary to all reason to refuse to it an important share in the development of this disordered habit, and in the production of the local affections which have hitherto too much engrossed the attention, to the exclusion of a proper consideration of the constitutional disease." We have cited Dr. Todd's observations, although forming part of this work, because they cannot in our opinion be too strongly pressed upon the consideration of the profession, so much importance do we attach to this disordered state of the digestive organs as a source of tuberculous disease. We shall return to the consideration of this subject when treating of the causes.

The intellectual functions are often performed with a preternatural degree of activity, a premature development of the mental faculties being a frequent accompaniment of the tuberculous habit; a circumstance which demands our attention on account of the practical rules to be founded on it in regulating the education of such persons. But this state of the intellect is by no means a constant attendant on the scrofulous constitution; indeed, the very reverse often prevails. Hence we have two opposite states of the mental as well as physical constitution; the one, attended by a florid complexion, thin, fair skin, and great sensibility to impressions, along with a corresponding acuteness of mind; the other, characterized by a dark complexion and coarse skin, with a languid, torpid condition of the bodily functions, and a like dulness of the mental faculties.

If we take a more particular survey of the functional derangements of the tuberculous constitution, we shall find that digestion is rarely well performed; that the bowels are irregular, more frequently slow in their action than the reverse, and that the evacuations are not of the natural appearance which they are known to possess in healthy persons. The urinary secretion, also, often deviates from the healthy standard, being generally turbid, particularly when the bowels are costive. The cutaneous functions are rarely in a healthy state; the skin is either pale, soft, and flaccid, or dry and harsh, and frequently affected with eruptions. In general, the insensible perspiration is defective, although copious partial perspirations are not uncommon, particularly in the feet, where they often have a fetid odour. The physical powers are generally below the usual standard. The limbs, though full, are soft, and want both the form and firmness of health. The circulation is generally feeble, as is indicated by a weak pulse, cold extremities, and inability to bear much bodily fatigue. This state of the circulating

system forms an essential element in the tuberculous constitution, at least we have rarely or never found it wanting, and we regard it as affording an explanation of many of the most important phenomena of the disease. A full development of the body and great muscular power are not, however, incompatible with the tuberculous constitution. Several of our celebrated pugilists have died tuberculous; and very lately one died of phthisis, within our knowledge, a short time after an obstinately contested fight, which proved fatal to his antagonist. Independently of their bearing on the present subject, such examples deserve attention, as showing the effect of training in increasing the strength even of the tuberculous system.

The tuberculous constitution is, also, further characterized by a peculiar liability in the subjects of it to certain diseases affecting in a special manner the mucous surfaces. We have already noticed the irritation of the digestive organs; there exists also, in general, a strong disposition to catarrhal affections, generally confined in early youth to the nasal cavities, often very tedious, and not unfrequently attended with a copious and long-continued discharge of thick yellow mucus. Epistaxis is also common in young children of the strumous constitution. The eyelids and the ears also are very liable to chronic inflammation, which is often attended in the latter organs by a discharge of puriform matter. Inflammation and a chronic congestive state of the mucous membrane of the internal fauces is likewise common, frequently terminating in chronic enlargement of the tonsils. The bowels are easily deranged, and often discharge large quantities of mucus upon slight causes of irritation. Slight febrile attacks are also common, being generally connected with irritation of the digestive organs. Eruptions on the hairy scalp are very frequent; and the external lymphatic glands become readily enlarged from slight irritation of the neighbouring mucous surfaces or of the skin, and from exposure to cold, &c. The catamenia in young females are also very often tardy in appearance and irregular in their return.

By the term Tuberculous Cachexia, we designate that particular condition of the system which gives rise to the deposition of tuberculous matter, on the application of certain exciting causes which will be noticed in a future part of this article, but which have no such effect on a healthy system. This morbid constitutional affection has been noticed by various authors under different names, (*latent scrofula*, *scrofulous diathesis*, &c.) and described under the present appellation in our work on 'Climate.' It is a state which may exist from birth, or be acquired at almost any period of life, from infancy to advanced old age. When thus acquired, the characters by which it is recognised are less clearly marked and less easily distinguished than when it occurs as an hereditary affection, or is engrafted on the tuberculous constitution. We want in a great degree the external features and form

which characterise the hereditary disease. But even when the disease has been acquired after maturity, the peculiar pallid hue approaching to a sallow tinge, together with the sunk and faded state of the features, are in general sufficiently well-marked to indicate the patient's condition. In persons of dark complexion this is accompanied by an unvarying sallow, or rather leaden hue of skin, and a dull pearly appearance of the sclerotica; and in the fair and florid, by a pasty aspect of the countenance, alternating with the irregular red and white mottled appearance of the cheeks, passing often from the paleness of death to a dark purplish hue, in a way more easily recognised than described. In more advanced life, the deep sallow cast of countenance, varying occasionally to a tinge of yellow, predominates and marks the slowly acquired but deeply-rooted constitutional disorder.

#### SECT. III.—OF TUBERCULOUS DISEASE OF THE LUNGS, OR PHTHISIS, PROPERLY SO CALLED.

In describing the course of tuberculous consumption, we shall endeavour to trace the connexion between the external symptoms, local and general, and the progressive morbid changes in the lungs; as it is only by keeping this connexion constantly in view that we are able to detect the pulmonary disease in its commencement, or distinguish it even in its more advanced stages, when rendered latent or obscured by the presence of other diseases.

Although a certain group of symptoms accompany tuberculous disease of the lungs, the order in which they present themselves and the degree of their severity vary remarkably in different individuals. In some cases the symptoms are so prominent as to excite the attention of the most careless observer, while in others they are so slight as scarcely to be observed by any but the medical attendant, and they even occasionally escape his observation.

We shall, in the first place, describe the more usual form and progress of phthisis, and afterwards notice the less common but not less certain forms which it assumes. We shall also adopt the mode of dividing the subject into stages, as it will enable us the more easily to connect the progress of the pulmonary disease with the symptoms by which it is accompanied.

##### 1. *Of the more common or general form of Phthisis.*

*First stage.*—It is natural to suppose that the symptoms of any disease should be expressive of impeded or disordered function of the organ in which such disease is seated, and hence in the present instance cough is generally the earliest symptom by which tuberculous disease of the lungs is indicated. It is first observed in the morning on getting out of bed, but is for some time so slight as scarcely to deserve the appellation, consisting of little more than one or two imperfect efforts to cough. After a longer or shorter period, this symptom occurs occasionally during the day, especially after slight exertion, and also at night on getting into bed. By degrees, the

morning cough is accompanied with the expectoration of a transparent ropy fluid, resembling the saliva, and apparently originating in the posterior fauces. The cough soon becomes attended with the same kind of expectoration during the day; but at this period of the disease, as well as through its whole course, the expectoration is generally most abundant in the morning.

Along with the cough, sometimes indeed preceding it, but much more generally occurring only after it has existed for some time, a degree of oppression of breathing is remarked on ascending stairs, or making any active exertion; and a tightness of chest or transitory pain is also frequently experienced on these occasions.

Soon after the appearance of the cough and dyspnoea—the first direct indications of the morbid condition of the lungs, the general system begins to sympathise with the local disease. The pulse becomes quicker than natural, especially after meals and towards evening. At this period of the day there is also frequently experienced a slight degree of chilliness, followed by some heat of skin, particularly in the palms of the hands and soles of the feet, which continues during the night. When this state of things has lasted for some time, perspiration succeeds the heat, occurring generally towards morning. Yet this febrile paroxysm is often so slight as to be overlooked by the patient, particularly its two last stages; the evening chill attracts more attention, as the sensations which accompany it are very unpleasant, but it rarely occurs without being followed by a degree of febrile heat. The sleep is now less sound and refreshing, and is occasionally disturbed during the night by cough.

While these symptoms of local disease are engaging our notice, those indicating the general state of the system are no less deserving of our attention. The aspect of the patient gives evident indications of tuberculous cachexia; the countenance is paler than usual, or changes colour frequently,—being at times, more especially early in the day and after a little fatigue, faded and expressive of languor; which indeed exists in a greater or less degree, the patient being little inclined or able for exertion, either bodily or mental: on examination at this time the skin will also be found to have lost its natural elastic feel, and the flesh its firmness, while a degree of emaciation is generally evident.

These symptoms may continue for a considerable period without any remarkable increase, varying in degree according to the state of the weather and the circumstances in which the patient is placed. If they have made their first appearance in the spring, they often diminish and may even cease as the summer advances, especially if the patient is put upon a judicious regimen and is sent to a healthy part of the country. The tubercular disease is interrupted by the amendment of the general health, and the patient may even improve so much as to lead him and his friends to think

the danger is past; but the following season too often undeceives them. If the symptoms have occurred early in the winter, the amelioration produced by the succeeding summer is seldom so evident; because in general the disease has made considerable progress during the winter. Still the state of the patient may undergo great amendment; the symptoms may almost disappear, and he may gain both flesh and strength; but the cough rarely ceases, and the first approach of cold weather, or the first attack of autumnal catarrh brings back the symptoms and feelings of the preceding winter with remarkable rapidity.

As the symptoms which have just been enumerated generally characterise the *first stage* of tuberculous consumption, it is a matter of great importance to determine the condition of the lungs with which they are associated. We have seen that cough, some dyspnoea, slight hectic fever, languor, debility, and commencing emaciation constitute the external or visible phenomena of the disease. Morbid anatomy informs us that the lungs at this period contain a greater or less quantity of tuberculous matter, the whole or a large proportion of which is still in what is called the state of crudity; that is, more or less firm, of a greyish colour, and somewhat transparent; or partly of a pale yellowish colour and opaque. The pulmonary tissue and bronchial membrane in the immediate vicinity of the tuberculous deposits may have undergone no perceptible alteration, or both may present a degree of redness and vascularity.

The *physical signs* afforded by an examination of the chest during life, under such circumstances, are unfortunately often obscure; though this will depend on the extent of the tuberculous matter and the manner in which it is deposited. If it be in small quantity, or diffused pretty generally through the lungs, little light will be thrown on the disease by auscultation; but when it is more abundant, and deposited, as it generally is, in the summit of the lungs, auscultation assists us greatly in detecting the real nature of the disease in doubtful cases. The sound elicited by percussion, when delicately performed, will often be found clearer under one clavicle than the other; the respiratory murmur, heard through the stethoscope, will be less soft and free where the duller sound exists, and the resonance of the voice greater at the same place. Unless, however, there is an obvious difference between the sounds heard in the relative situations on both sides, the signs afforded by auscultation are not much to be depended on at this early stage of the disease; and in many cases we have to form our opinion of the patient's condition from the local and constitutional symptoms only. In other instances, however, with the same symptoms, the physical signs afford the most unequivocal indications of the existence of pulmonary disease. The sound elicited by percussion is evidently less clear under one clavicle; the respiration less soft and easy, and the voice decidedly more resonant than under the opposite clavicle; and,

even at this early period, the motions of the upper parts of the chest, carefully observed during inspiration, may often be remarked to be unequal; one side of the chest being more fully expanded during inspiration than the other. When this is the case, it will generally be found that the side least elevated is that which gives the most evident signs of the existence of tubercles. When the tuberculous matter is diffused over a large portion of the lungs, puerile respiration occasionally indicates its presence. A marked inequality in the sound of the respiration in different parts of the chest also affords strong suspicion of tuberculous disease, when such inequality cannot be otherwise accounted for.

By a careful inquiry into the state of the patient's health previously to the period now under consideration, and by attention to the various symptoms which have been enumerated, the physician who has been accustomed to trace the connexion of symptoms with the morbid changes of the organ, of which they are merely the external manifestations, will rarely fail to arrive at a correct opinion in such a case; and if he has availed himself of the evidence derived from the physical signs, he will have the positive assurance that his diagnosis is correct in a very large proportion of cases. Yet it often happens that a patient presenting all the indications of tuberculous disease which have just been stated, is said, and believed to be, merely *threatened* with disease of the lungs, or to have an affection of the trachea or bronchi; and it is commonly added that, "with care, all will do well." This arises from the habit of trusting to symptoms alone for a knowledge of disease, neglecting pathological anatomy, by which the physician is enabled to connect the external phenomena of disease with the morbid condition of the organ.

*Second stage.*—The circumstance which has been considered as marking the passage from the first to the second stage of phthisis is a remarkable change in the expectoration. The colourless frothy expectoration, which had hitherto attended the cough, is observed to contain small specks of opaque matter of a pale yellowish colour; the proportion of which gradually increases, forming patches surrounded with the transparent portion in which it seems to float. Specks or streaks of blood are also often observed in the expectoration at this time.

With this change in the expectoration the other symptoms generally increase; the cough becomes more frequent and troublesome, the evening chills more constant and severe, the succeeding heat of skin greater and more general, and the morning perspirations more regular in their occurrence and more copious. The hectic fever is now established; the pulse is frequent at all times, and the respiration hurried, even when the patient is at rest. The sense of languor and weakness also increases; the patient or his friends remark that he is losing flesh, and that what remains is soft and flabby; and he feels himself quite unequal to

the degree of bodily or mental exertion to which he had been accustomed. The face is generally pale during the day, while a circumscribed flush of the cheek is often remarked towards evening. About this period also, if not earlier, pains which are usually considered rheumatic, are often experienced in the side and in the neighbourhood of one or both shoulders. Hemoptysis is likewise a frequent occurrence, amounting in some cases merely to a slight streak in the expectoration, while in others a considerable quantity of pure un-mixed blood is brought up.

These symptoms are accompanied by a corresponding change in the morbid condition of the lungs. The tuberculous deposit has undergone that process which is called *softening*; that is, it has been softened and diluted by a morbid secretion from the surrounding pulmonary tissue; and the change in the character of the expectoration indicates at once the softening of the tuberculous matter, and its passage into the bronchial tubes. While this process of softening is taking place in the tuberculous masses of earliest formation, the pleura covering the diseased portion of lung generally becomes adherent to that of the ribs, by the effusion of lymph which is subsequently converted into cellular tissue. The extent and firmness of these adhesions are generally proportionate to the extent and duration of the tuberculous disease. The pains which are very commonly experienced in the upper and lateral parts of the chest are, no doubt, partly the consequence of the slight pleuritic inflammation which precedes the uniting process; and accordingly we have generally found on inquiry that the pains were either confined to, or more frequent and severe on that side of the chest where the most extensive tuberculous disease was manifest.

While the tuberculous matter is being thus softened and expectorated, leaving excavations of a greater or less extent in the superior lobes, the lower portions of the lungs are gradually becoming tuberculous, the progress of the disease being usually from above downwards.

A careful examination of the chest at this period affords positive evidence of the internal mischief. The upper parts are less freely raised during inspiration than in the healthy state; and this is frequently more evident on one side than the other. The sound on percussion is dull under both clavicles; and on applying the stethoscope or ear to the chest, a slight crackling noise (*crepitating rhonchus*) is heard, while a gurgling sound (*cavernous rhonchus*) is frequently produced by coughing. The voice is more resonant, amounting generally to bronchophony; and distinct pectoriloquy is often heard in one or more points of the clavicular or scapular regions. All these indications are very generally more evident on one side than the other; and hence, in obscure and complicated cases, arises the advantage, and even the necessity of attending more particularly to this circumstance, in order to enable us to establish our diagnosis with more certainty and precision.

The extent to which the lungs have become tuberculous in the stage of phthisis now under consideration, varies remarkably in different cases, without a corresponding difference in the severity or duration of the symptoms. Two patients having symptoms exactly similar, may, on examination of the chest, present a very striking difference in the extent of the pulmonary disease: hence, by trusting to the symptoms alone, without having a due regard to the physical signs, we shall often be led into error in estimating this important point.

The length of time during which a patient may continue in the state which we have described, also varies remarkably. In some cases a few weeks suffice to bring him to the brink of the grave, while in others many months, and even years may pass away without any remarkable increase or diminution of the symptoms, or, there is reason to believe, of the pulmonary disease. In a small proportion of cases a curative process is established, by which the effects of the disease are in a greater or less degree obliterated; and if the patient's general health is maintained in a good state, there may be no return of tuberculous disease.

In the stage which we have been considering, the symptoms do not often indicate the presence of tubercles in any other organ; although during the progress of the disease there is scarcely an organ or part of the body that may not become tuberculous.

*Third stage.*—This has been termed the colliquative stage, from the copious perspirations, the frequent attacks of diarrhoea, and the abundant expectoration by which it is usually attended. With these symptoms, but more especially with the diarrhoea, the emaciation and debility generally keep pace: the cough also becomes more distressing during the night as the disease advances, and the patient frequently suffers greatly from pains of the chest; while his breathing is much oppressed on the slightest exertion. The feet and ankles become œdematous towards evening; the swelling at first disappearing in the course of the night.

The chest examined at this advanced period of the disease is found to be remarkably changed in its form: the shoulders are raised and brought forward; the clavicles are unusually prominent, leaving a deep hollow space between them and the upper ribs; and the chest is flat in place of being round and prominent. The clavicular regions are nearly immovable during respiration; and when the patient attempts to make a full inspiration, the upper part of the thorax, instead of expanding with the appearance of spontaneous ease peculiar to the healthy state of the lungs, seems to be forcibly dragged upwards at each effort to accomplish it. Percussion gives a dull sound over the superior parts of the chest, although the caverns which partially occupy this part of the lungs, and the emaciated state of the parietes render the sound less dull than in the preceding stage. The stethoscope affords more certain signs: the respiration is obscure and in some places inaudible, while

in others it is particularly clear, but has the character of the bronchial, or tracheal, or even the cavernous respiration of Laennec. Coughing generally gives rise to a gurgling sound (*gargouillement*); and pectoriloquy is more or less distinct, for the most part on both sides, although more marked on one than on the other. In this state the patient may still linger for many weeks, or even months, reduced to a perfect skeleton, and scarcely able to move in consequence of debility and dyspnoea.

With the loss of physical strength, the energy of the mind generally undergoes a corresponding diminution; the reasoning faculty remains, but evidently diminished in its powers. Though inwardly conscious of his decay, the patient does not absolutely adopt the conclusion, but founding hopes chiefly on the uncertainty of our art, seldom excludes the possibility of recovery, until at last he becomes indifferent to what is passing around him and to his own state; and this even when he had been hitherto remarkably alive to every symptom.

During the last weeks of existence an aphthous state of the mouth usually occurs, and is a sure forerunner of approaching dissolution. Delirium, generally of a mild character, likewise occurs at intervals at this period, although in some cases it is entirely wanting. In a few instances we have observed violent delirium during several days preceding death.

Such is the more common progress of tuberculous disease of the lungs, and the phenomena by which it is accompanied and characterised: we shall presently enter into a more full examination of the different symptoms.

It has often been stated that pulmonary consumption is a mild disease, by which the patient is imperceptibly wasted away, without pain or suffering, indulging the hope of recovery to the last. They must have witnessed but little of the disease who could state this to be its general progress. The miserable sensations produced by the frequent chills during the day, and by the more distressing and death-like chills which follow the copious perspirations in the night and morning; the harassing cough and expectoration; the pains of the chest; the frequent dyspnoea, amounting often to a threatening of suffocation; the distressing sense of sinking produced by the diarrhoea,—all increasing as the strength of the unfortunate patient is failing;—and, more than these, that “*contention de l'esprit*,” that inward struggle between hope and fear, which, whether avowed or not, is generally felt by the patient in the latter stages,—make up an amount of suffering which, considering the protracted period of its duration, is seldom surpassed in any other disease.

But as phthisis differs remarkably in the rapidity of its progress, and the severity of its symptoms, so does it also in its mode of termination. In many cases the patient's sufferings cease and give place to a state of tranquillity during the last days of life; and he sinks gradually without a struggle. In other cases (and most frequently in young subjects) the struggle continues to the last.

*Duration of Phthisis.*—Tuberculous consumption is essentially a chronic disease, the range of its duration being very considerable. Cases have been recorded which have terminated in eleven days;\* while others have lingered for twenty and even forty years.† These, however, are extreme cases, and of rare occurrence; and in endeavouring to fix the average duration of phthisis, we must exclude these very acute as well as the very protracted cases.

The following tables, extracted from the works of Bayle and Louis, give an accurate view of the duration of phthisis in three hundred and fourteen cases. In the first table the numbers of cases which came under the observation of each physician are given separately, in order to show how closely they correspond.

TABLE I.

Duration of Disease.	Number of Cases.		Number of Cases.		Total.
Months.	Louis.	Bayle.	Louis.	Bayle.	
1	1	1	8	+	16 = 24
2	4	6			
3	3	9			
4	5	12			
5	11	14	25	+	44 = 69
6	9	18			
7	9	18			
8	9	14			
9	7	12	25	+	44 = 69
10	4	8			
11	3	7			
12	5	5			
13	2	6	12	+	21 = 33
14	4	10			
15	6	5			
16	0	3			
17	2	4	3	+	9 = 12
18	1	2			
19	1	2			
20	1	3			
21	0	6	10	+	18 = 28
22	0	3			
23	0	2			
24	8	2			
Years.					
3	6	6	14	+	14 = 28
4	6	5			
5	2	3			
6	0	1			
7	0	3	1	+	9 = 10
8	0	1			
9	0	3			
10	1	1			
12	2	1	4	+	5 = 9
14	1	0			
20	1	4			
40	0	0			
	114	200	114	+	200 = 314

\* Portal, t. ii. p. 262, and Andral, Archives de Méd. t. ii.

† Portal, t. ii. p. 251. Bayle, Andral, &c.

The mean duration of phthisis calculated on this table is twenty-three months, that is, including the extreme cases; but it will be observed that one hundred and sixty-two, or more than one-half of the cases, terminated in nine months, and the greatest proportion of these between the fourth and ninth months. By excluding those cases which terminate within four months and those that exceed four years, the average duration of the remaining cases is eighteen months.

TABLE II.

Time.	1	2	3	Time.
	Dead	Alive	Die	
Months				Months
in 3	8	92	8	from 1 to 3 inclu-
6	30	70	22	4 „ 6 [sive
9	52	48	22	7 „ 9
12	62	38	10	10 „ 12
15	72	28	10	13 „ 15
18	76	24	4	16 „ 18
24	85	15	9	19 „ 24
Years				Years
5	94	6	9	3 „ 5
10	97	3	3	6 „ 10
40	100	0	3	11 „ 40

This table is constructed from the first. The numbers are reduced to proportions of one hundred, and placed so as to exhibit the law of mortality in phthisis. Supposing one hundred persons to be attacked with phthisis at the same time, the first column shows the number who will die by the end of the third month, sixth month, &c., the second column shows the number living, and the third how many die in the various periods of the disease.

These tables are calculated on fatal cases which occurred in hospital practice. The duration of the disease in private life, with its many advantages and comforts of which hospital patients are necessarily deprived, is considerably greater. M. Andral's experience at La Charité led him to fix the average duration of the disease in that hospital at two years, which is very near the average deduced from the tables of Bayle and Louis, when the extreme cases are taken into the account; but it is evident, from an inspection of these tables, that much the larger proportion of cases die considerably within this period.

Various circumstances affect the duration of phthisis;—the age, the sex, and constitution of the patient, as well as the external circumstances in which he is placed, such as the occupation, the season of the year, climate, &c., have all, no doubt, their influence. Louis considers age as having little effect on the duration of phthisis, except in very acute cases, which are more frequent in early life. Our experience in this respect differs from that of M. Louis, at least in our private practice; but we admit that we cannot refer to our cases with the numerical precision of that accurate physician. Among females,

Louis found the mortality greater within the first year than among males, in the proportion of forty-two to thirty; after this period the ratio of mortality as to time was the same in both sexes. In the upper ranks of society, where such patients have all the advantages that a proper regimen, change of air, and good medical treatment can afford, the medium duration of phthisis is probably not much short of three years; under other circumstances it is less. We fear that the cures occur in so small a ratio that we are not entitled to bring them into the calculation in estimating the duration of phthisis.

## II.—Of the more marked varieties of Phthisis.

Although tubercular phthisis is essentially the same in its anatomical characters and constitutional origin, it varies so remarkably in the duration of its course and the external features which it assumes, as almost to appear a different disease. We shall, however, endeavour to describe these different and less usual forms, so that they may be recognised even in their earlier stages.

Five forms of phthisis, differing from the ordinary course of the disease, appear to us worthy of notice; and we must be allowed to observe that such distinctions are not mere pretensions to refinement, but, on the contrary, are of great utility both as regards the diagnosis and treatment of the disease; for, as we shall find, each of these forms has something in its character which it is important to mark, in order to distinguish the nature of the disease at an early period of its course.

1. *Acute Phthisis*.—The usual duration of phthisis has been already stated to range from nine to eighteen months; in the present variety it frequently runs its course in three or even two months, and occasionally in five or six weeks.

The acute form of phthisis admits of a useful division into two varieties, in one of which the short duration of the disease appears to depend chiefly on its violence, or the activity of the morbid process; and in the other, on the feeble powers of the constitution, which sink under the pulmonary disease long before it has reached the degree in which it usually proves fatal. This last variety is observed chiefly in delicate young persons, and more frequently, according to our observation, in females than in males. The ordinary state of health of such persons is far below the common standard; they are possessed of the highest degree of the tuberculous constitution or temperament; they are weak, easily fatigued, and have generally a languid circulation, indicated by a feeble pulse and cold extremities, even in their best health, and before any suspicion exists that these general phenomena are connected with tuberculous cachexia. The symptoms of consumption in such persons are often little marked; so little indeed that these cases might almost be ranked under the latent or occult form of the disease,—the real condition of the patient often escaping observation till phthisis is far advanced. But, although the symptoms are slight, they are generally sufficient to en-

able the physician to distinguish the disease, especially when the general aspect and constitution of the patient are taken into account. There is a slight cough with some shortness of breathing; and the pulse is frequent or easily rendered so by the slightest exertion. The patient is weak, but scarcely considers herself ill; there is no pain of chest, no hemoptysis, and perhaps no expectoration. Debility is usually considered the cause of these symptoms, and even when they are accompanied with morning perspirations and well-marked emaciation, the friends are scarcely alarmed. They tell us that she was always short-breathed and liable to cold; and the cough seems of so little consequence that they think the lungs must be sound. In this way the patient continues to become rapidly worse; the cough is more troublesome, and is by degrees accompanied with some expectoration, in which a tinge of blood occasionally appears. The breathing is now also observed to be quick, even when the patient is at rest; the pulse is rapid, and there are frequent and often very copious morning perspirations. The countenance of the patient alone, at this time, is very often sufficient to indicate the danger: it is generally pale and of a leaden hue, the lips are often of a blueish colour, and the albuginea of a peculiar dull pearly tint; the whole features are sunk and the countenance faded. Without any increased activity of the symptoms, such a patient may sink rapidly under an attack of diarrhoea, and a fainting fit unexpectedly terminate the scene.

This is an insidious form of the disease and requires the closest attention of the practitioner, because it is one which he is liable to overlook, both on account of the obscure character of the local symptoms, and the little attention given to them by the patient's friends. The feeble persons who fall victims to this form of phthisis are, as we have already remarked, merely valetudinarians in their best state of health: their natural state is one of weakness, they are incapable of much exertion, are easily fatigued and even exhausted, and are oppressed by a high, and chilled by a low temperature: they have the lymphatic constitution of the child without the power and activity of the child's circulating system, and yield to the ordinary causes of disease with remarkable facility. The transitions from health to a state of tuberculous cachexia, and from this to the development of tubercles in the lungs, are easy and almost imperceptible in such persons, except to a close and experienced observer.

The other variety of acute phthisis presents itself in more striking characters. All the symptoms of phthisis are present in an unusual degree of severity, and succeed each other with great rapidity. The cough increases daily, and the expectoration goes through its various changes in the course of a few weeks; the hectic fever is violent, the morning perspirations are copious, and diarrhoea usually contributes its share in the destruction of the patient, who sinks rapidly in the course of six or eight weeks, dying of what is expressively

termed by the public, "a galloping consumption." M. Andral has given four cases of this rapid form of phthisis, three of which occurred in young subjects, and varied in duration from twenty-one to thirty-five days.\* Indeed, young persons are generally the subjects of this variety; and it frequently occurs soon after the cessation of acute febrile diseases, as fever, scarlatina, measles, &c. The manner in which these diseases determine and modify phthisis we shall have occasion to show when treating of the exciting causes.

There are two modes in which this rapid progress of phthisis may be explained. It often occurs in persons of a constitution so highly tuberculous, that it only requires the application of some exciting cause to determine the deposition of tuberculous matter in the lungs. In other cases this rapid course of the disease is more apparent than real. The tuberculous disease of the lungs, though latent, has been making silent progress, until an attack of catarrh or hemoptysis occurs, from exposure to cold or violent exertion, producing pulmonary congestion: the disease henceforward puts on its usual symptoms, and, owing to the previous advanced state of the tubercles, proceeds with unusual rapidity in its course. This view is supported by minute inquiry into the history of such cases, and by the fact that they generally occur in the members of families of a strongly marked tuberculous constitution.

The error into which this variety of acute phthisis is calculated to lead an inexperienced or careless practitioner, is that of considering and treating it as a purely inflammatory disease, and using much more active measures, and giving a more favourable prognosis, than the real nature of the case justifies. An inquiry into the previous health of the patient and careful observation of the symptoms will soon unveil the real nature of such cases. It is true that inflammation in some part of the respiratory organs often exists, complicating the tuberculous disease; but it requires to be treated with much more delicacy than a simple inflammation, and a very different prognosis should be given.

2. *Chronic Phthisis*.—As opposed to the acute form of the disease which has just been noticed, the present variety may well be termed chronic, since it often occupies more years than the former does weeks. Bayle and Laennec were the first who described the nature of these protracted cases, and showed the identity of the disease, whether it occupied the greater part of a long life, or proved fatal in the course of a few weeks.

The acute form of phthisis occurs most frequently, as we have remarked, in young subjects; the present form commonly takes place at a more advanced period of life, from the fortieth year upwards; though it is occasionally met with at a much earlier age.

In the acute form, the tubercular diathesis is generally hereditary and strongly marked;

and the application of those causes which usually call it into action speedily produces their effect. In this form, on the contrary, the tubercular diathesis, if hereditary, is not strong, or has been kept in check by the favourable circumstances in which the individual has been placed; or it has been induced, in the progress through life, by causes which we shall have occasion to notice in another part of this article. However this may be, the tuberculous disease of the lungs at a late period of life is often slower in its progress, whether this depends on the minor degree of constitutional affection, or on the greater powers of the system to resist its destructive influence.

The disease in its chronic form is little marked in its early stages; the patient looks out of health; he is languid and capable of little exertion; he has occasionally a slight cough, but it scarcely attracts attention; he has no fever, and his appetite is even good. As it very generally occurs in persons whose situation in life or occupations give rise to dyspeptic complaints, the stomach is the organ blamed for the patient's indisposition. The friends and patient himself are often confirmed in this by the effects of fine weather, a visit to the country, or a summer tour; by means of which the patient recovers his looks and his lost flesh and strength, and his cough ceases. In the succeeding winter and spring the cough returns, he loses flesh again, and his looks indicate internal disorder, while he is more than usually susceptible of the impressions of cold. Still the succeeding summer improves his health. At times during this state of things his disease puts on a more serious aspect: during an attack of catarrh the cough becomes severe, and is attended by fever and a copious expectoration—symptoms which appear to threaten his life. But even from this state he may recover more than once, till the disease shall at last put on the form of a chronic catarrh, aggravated from time to time by slight exposure to cold during the winter and spring; while he may still enjoy a very tolerable state of health during the summer, and in this way may continue to linger on in a miserable state of existence for years, yet little aware of the real nature of his disease.

Under such circumstances, the person is generally able to go on with his usual avocations, though not with his wonted energy; and if they are of a nature that require much bodily exertion, or expose him to the inclemencies of the weather, they are often interrupted by attacks of acute catarrh, of pleurisy, or pneumonia. Under more favourable circumstances a person in this state may escape such attacks, but he is more easily fatigued, is rarely free from cough a week at a time, and his breathing is generally oppressed on using any bodily exertion. Although his appetite is generally good and he eats heartily, he remains thin, is generally pale, and is equal to little exertion, bodily or mental. In short, though capable of performing his usual duties, he does them in a very different manner from that which was his wont before his present complaint, and yet his

\* Archives Générales de Médecine, vol. ii. p. 205.



friends are scarcely sensible that he is labouring under any local disease beyond a common chronic catarrh. This is a state of things which is not uncommon in persons living in easy circumstances, and who are not required to make much exertion, or expose themselves to the vicissitudes of the weather, or to other exciting causes. They are considered delicate; they find it necessary to take care of themselves, but the nature of their ailments frequently remains long unsuspected. The cough is little regarded, because it does not increase and gives very slight trouble, and even abates so much during the summer as to be scarcely remarked. The breathing is short, but the dyspnoea has come on so slowly that the patient is hardly aware that it is a new complaint, and often deceives himself in thinking that he was always short-breathed. Invalids of this description are rarely free from dyspepsia in a greater or less degree; they are liable to an increase of the catarrhal symptoms from slight exposure to cold, and are frequently subject to attacks of diarrhoea, from which their recovery is often tedious and protracted.

An examination of the chest under the circumstances which we have just now noticed, will generally leave no doubt of the existence of tubercular disease of the lungs. The respiratory movement of the upper part of the chest will be found to be much more limited than natural, especially when the patient makes a full inspiration. One or both of the clavicular regions will give a dull sound, and the voice will be more resonant, and occasionally there will even be perfect pectoriloquy. In such cases, not only does tubercular disease exist, but the tuberculous matter has become softened and been expectorated, leaving cavities in the summit of the lung, some of which have been emptied of their contents, and are either in the progress of cure or actually cicatrized.

We have already observed that such a patient may exist for many years, if his habits of life are temperate and regular, and he avoids exposure to causes capable of inducing inflammatory affections of the lungs. But even with these precautionary measures, his situation is most perilous; the lungs are already partially diseased, they are diminished in capacity, and are in a state of constant congestion, and are consequently far more liable to take on diseased action. An attack of catarrh, bronchitis, or pneumonia, that would otherwise have easily passed over, frequently proves fatal to such a person, or leaves him in a state of great debility, during which the tuberculous disease makes more rapid progress; and he soon sinks under it, often with all the symptoms of well-marked consumption, which, even under all the circumstances we have stated, is not unfrequently attributed both by the patient and his attendants to the inflammatory attack, which was merely a superadded and accidental occurrence. The same effects will often be produced by a severe attack of rheumatism, or fever, or any other disease which is accompanied with fever, or leaves the patient in a debilitated state.

The influenza which prevailed in this country in the summer of 1832, and still more severely and generally in the spring of 1833, proved fatal to many such invalids, either during its attack, or in consequence of the debility which it left behind it, from the effects of which the patient never rallied. To persons labouring under the earlier stages of tubercular disease, the influenza proved equally, though not so speedily fatal; and it was in such patients that the origin of the disease was, with a greater appearance of truth, attributed to the influenza.

We can only account for this slow progress of tuberculous disease of the lungs by the supposition that the constitutional disposition to such an affection has been slowly induced during the person's advancement through life, without having ever acquired the force or pervading influence of hereditary disease. This view is supported by the fact that such protracted cases are most frequently observed in the upper ranks of society, where the person enjoys all the comforts of life, and though often engaged in an unhealthy occupation, is enabled to recover his health from time to time by country air and relaxation from the cares of business. On the other hand, the laborious part of mankind are much more rarely affected by this prolonged form of phthisis. The disease often occurs late in life among the lower ranks, but its progress in them is more rapid, and more closely resembles its course at an earlier age; although in females, and some men, such as coachmen and grooms, when they are not addicted to the use of spirits, the disease often runs on for years.

Among the poor Irish labourers in London it is very common. In this class of persons, one attack of catarrh, or pneumonia, or pleurisy, is succeeded by another, until the greater part of the lungs becomes diseased, and the surfaces of the pleura are adherent over their whole extent, the patient scarcely moving his chest during respiration. After death, the lungs are found to present such a mass of disease, partly tubercles and partly the effects of inflammation, that it is difficult to say which had the greater share in determining the patient's fate. Of the nature of the primary disease of the lungs little is to be learned from such examinations.

This chronic form of phthisis deserves the particular attention of the physician. First, because its nature is liable to be overlooked till it has made considerable progress, and the opportunity of doing good may be lost; and secondly, because medicine often accomplishes much more in this form of the disease than in those which are more rapid in their course. Indeed, in many of these chronic cases we believe the progress of the pulmonary affection may be often checked, and the patient's life not only prolonged, but his health even improved. Time is given for the adoption of such measures as are calculated to amend the general health, and even to remove, or at least check the tuberculous cachexia, and

other derangements which increase the local disease. We allude especially to irritation of the digestive organs, to congestion of the liver and the abdominal circulation generally; pathological conditions which play an important part in the production of the disease, as we shall endeavour to show in the proper place.

3. *Phthisis in Infancy and Childhood.*—Since morbid anatomy has been more sedulously cultivated, tuberculous disease has been found a more frequent cause of death in childhood, and even infancy, than was formerly imagined.

Phthisis at this early period of life differs somewhat from the disease in adults, both in its situation and symptoms. The cough which attends the consumption of childhood is very often of a different character from that which accompanies the disease in persons of mature age; it frequently occurs in paroxysms resembling whooping-cough, and is rarely attended with expectoration till a late period of the disease, and very frequently this latter symptom is entirely wanting, from the matter being swallowed; so that we are deprived of the light which the character of the expectoration might throw upon the nature of the disease. Hemoptysis is also a rare occurrence; at least, we do not recollect to have met with any case in which it was present. The hectic fever is likewise less perfectly formed, and the perspirations are generally less than in the adult.

The disease, however, is not usually difficult of detection, if we attend to the other symptoms. The tuberculous aspect of the child, the rapid pulse and breathing, the frequent cough, and the gradually increasing emaciation, commonly afford sufficient evidence of its existence. Phthisis in children is often accompanied or preceded by considerable derangement of the digestive organs; the abdomen is tumid, the bowels are irregular, at one time constipated, and affected by diarrhoea at another; the evacuations under both circumstances being generally of a pale, unnatural colour. This deranged state of the functions of the abdominal viscera has often led to the belief that the mesenteric glands were the chief seat of the disease; whereas in reality the bronchial glands and lungs are its most common seat, even at this early age. It is true that the mesenteric glands are more frequently tuberculous in infancy and childhood than at a later period of life, but by no means so frequently, nor to so great a degree, as is generally supposed.

Pulmonary consumption is of far more frequent occurrence in early life than is commonly believed in this country. In France, where the extent and constitution of their hospital establishments have enabled the medical officers to investigate the morbid anatomy of disease upon an extensive scale, the tuberculous affections of children have of late occupied particular attention, and much valuable information has been collected on the subject. Dr. Guersent, one of the physicians to the 'Hôpital des Enfants Malades,' (an

institution appropriated to the treatment of patients between the ages of one and sixteen years,) gives, as the result of his observations, that five-sixths of those who die in that establishment are more or less tuberculous.\*

At this early age the most frequent seat of tubercle is the bronchial glands. Here the disease commences, and occasionally proves fatal without affecting the lungs or any other organ. This form of the disease has been denominated bronchial phthisis (*phthisie bronchique*); and the name is unexceptionable, if the term phthisis be confined to the disease arising from tubercles.

This form of phthisis is almost peculiar to childhood; at least it is much more frequent at this period of life, and it is at this age only that tuberculous disease is confined to the bronchial glands. The following table, from Papavoine's excellent memoir on tuberculous diseases, will show the ratio of its occurrence in early life. It is the result of fifty careful post-mortem examinations of children, made with the view of determining the relative frequency of tubercles in different organs.†

TABLE III.

Bronchial glands .....	49 times
Lungs .....	38 "
Cervical glands .....	26 "
Mesenteric glands .....	25 "
Spleen .....	20 "
Pleura .....	17 "
Liver .....	14 "
Small intestines .....	12 "
Peritoneum .....	9 "
Large intestines .....	9 "
Brain .....	5 "
Cerebellum .....	3 "
Membranes of the brain.....	3 "
Pericardium .....	3 "
Kidneys .....	2 "
Stomach .....	1 "
Pancreas .....	1 "
Vertebræ, radius, tibia, .....	1 "

A comparison of this with the result of Louis's observations, as given in the following table referring to persons above the age of fifteen, who died of phthisis, will show the relative occurrence of tubercles in different organs in the two periods of life.‡

TABLE IV.

Small intestines .....	about $\frac{1}{2}$
Large intestines .....	" $\frac{1}{2}$
Mesenteric glands .....	" $\frac{1}{2}$
Cervical glands .....	" $\frac{1}{10}$
Lumbar glands .....	" $\frac{1}{15}$
Prostate .....	" $\frac{1}{15}$
Spleen .....	" $\frac{1}{15}$
Ovaries .....	" $\frac{1}{15}$
Kidneys .....	" $\frac{1}{10}$

\* *Le Blond*, Sur une espèce de phthisie particulière aux enfans. Paris, 1824.

† *Journal de Progrès des Sciences Médicales*, t. ii. p. 93.

‡ *Louis*, Recherches sur la Phthisie. Rapport, pp. 4, 5.

M. Andral, in noticing the greater frequency of tuberculous disease of the bronchial glands in children than in adults, observes that this is in accordance with the affections of the other lymphatic glands. The bronchial membrane in the neighbourhood of the diseased glands was, for the most part, found by this physician in a state of inflammation, just as is frequently remarked in the intestines of children when the mesenteric glands are tuberculous. But although M. Andral generally found the bronchial membrane red in the vicinity of these glands, it was not invariably so: in some instances they were found in a tuberculous state where there were neither symptoms of catarrh during life, nor the least trace of inflammation, old or recent, after death.\* Still the connection of inflammation in the mucous membrane of the intestinal canal and bronchi with tuberculous disease of the neighbouring glands, seems more intimate in early life than after puberty.

The symptoms which indicate the presence of tuberculous disease in the bronchial glands are generally for some time obscure; hence these organs may be tuberculous to a considerable extent without this being detected, as it is not until they acquire a considerable size, and irritate the bronchi mechanically, that the local symptoms become evident. The child coughs and is very liable to catarrh, and occasionally it points to the upper part of the chest as the seat of irritation. But the same symptoms may be produced by common catarrh or pulmonary tubercles to an equal degree. When the diseased state of these glands is further advanced, the nature of the case is more easily detected. When there is cough, hectic fever, and emaciation in a child, and when a careful examination neither discovers tuberculous disease in the lungs nor in the mesenteric glands, we may feel tolerably certain of its existence in the bronchial glands. In some cases these glands are so much enlarged as to fill up a great portion of the posterior mediastinum, and even to produce a swelling by the side of the trachea, which is visible externally; but this is rare. If the child is old enough to expectorate, and tuberculous matter is brought up, while we can discover no cavity in the lungs, the diagnosis is almost certain.

Tuberculous disease, however, does not, in general, remain long isolated in the bronchial glands; other organs, especially the lungs, become tuberculous, and the symptoms are then of course complicated. Still there are some cases in which the disease proves fatal while confined to these glands: an interesting case of this kind is given in Dr. Alison's excellent paper on scrofula, in the Transactions of the Edinburgh Medical Society:—"J. S., æt. five, a boy of ordinary stature, and pretty stout, but somewhat rickety, and with a small scrofulous sore on his leg, was attacked in the end of November 1815, with well-marked pneumonic symptoms. While these were recent, he was seen by different medical men, who had no doubt of their nature,

and he was bled twice at the arm, and used the other usual remedies, with very imperfect success: the heat of skin, febrile oppression, and dyspnoea abated somewhat, but his breathing continued short, his cough very troublesome and dry; and he passed gradually into the state of perfect hectic, the rigors in the afternoons and morning sweats being unusually severe. He died, considerably emaciated, in the end of January 1816. On dissection, the lungs were found of the natural spongy texture throughout, and the disease appeared to have been confined to the bronchial glands, which were enormously enlarged, and all converted into the usual cheesy or tubercular matter. There was no other disease in the thorax or abdomen." (p. 425-6.) Had the previous history of this case been better known, it would in all probability have been found that the bronchial glands were diseased long before the attack of pneumonia; and had the tuberculous disease been seated in the lungs in place of those glands, it might have been considered the consequence of the inflammation, which, it is worthy of remark, had existed and disappeared without leaving a trace of its presence behind, even in a tuberculous subject.

It is not quite a matter of indifference whether the seat of the tuberculous disease be the bronchial glands or the lungs. In the former situation the progress of the disease is slower, continuing in some cases for years, during which the little patient may enjoy pretty good health. The disease being seated in organs much less essential to life than the lungs, interferes less with the general functions of health, and gives time for the application of remedies which its situation in the lungs does not allow. In this respect it resembles a similar affection of the external glands, and like it also is susceptible of cure.

The termination of this disease is various. That the tuberculous state of the bronchial glands may be removed by absorption, as we see occur in the lymphatic glands of the neck, we have every reason to believe; but this is probably the less frequent termination. Another mode of cure is that by which the softened tuberculous gland empties itself into the bronchial tube with which it is in contact, by ulcerative absorption of the walls of the tube, as is shown in Dr. Carswell's beautiful plates. The matter being evacuated, the cavity in which it was contained gradually contracts till it is obliterated; and the cure, as far as this gland is concerned, is complete. The less frequent cure is that in which a portion of the gland, or rather of the tuberculous matter, remains in a cretaceous form: but we are encroaching on another section of our subject.

The prognosis of this form of phthisis must always be doubtful, inasmuch as it depends on a circumstance which we are unable to ascertain, namely, the extent to which the bronchial glands are diseased, and on the complications which so often accompany this affection. The prognosis, however, will be more favourable than when the disease exists in the lungs.

\* Clinique Médicale, t. ii. pp. 254-55.

4. *Febrile Phthisis*.—The acute form of phthisis already noticed differs materially in its symptoms from that which we are now about to describe. In that, the disease was seen to differ from the usual course of phthisis, chiefly in the rapidity of its progress; the symptoms and morbid appearances being the same in both cases. In the variety which we are now considering, we shall find peculiarities which mark its character as differing essentially from the acute as well as from the usual form of the disease.

This variety occurs suddenly, is accompanied by a train of symptoms dissimilar, to a great extent, from all other forms of phthisis; and even the morbid appearances discovered after death are somewhat peculiar. The degree of fever with which it is usually ushered in and attended during its whole course is one of its most remarkable features, and that one from which we have ventured to denominate it *febrile phthisis*.

Its attack, as we have just stated, is generally sudden, occurring in a state of apparent health, after exposure to cold, or even without any very evident cause. We say apparent health, because we believe that the disease never occurs in a healthy constitution. It attacks persons of a tuberculous diathesis; and the most marked cases which have come under our observation have occurred in persons having a strong hereditary disposition to phthisis,—in members of families, several of whom had already fallen victims to the disease in its usual form.

It commences with shivering, followed by heat of skin, quick pulse, and the other symptoms of fever, which often continue for several days with little or no indications of pulmonary disease. In some cases it puts on the characters of bilious fever, and in others of catarrhal fever, for both of which it is sometimes mistaken; indeed we believe it would have been such in a healthy constitution, but occurring in a person labouring under tuberculous cachexia, the rapid deposition of tuberculous matter in the lungs is the consequence of the disturbance created in the system by the febrile attack. Cough, however, soon appears, and the breathing is noticed to be particularly rapid, which is one of the most marked and constant symptoms of this form of phthisis. The cough, when it has once occurred, becomes speedily more frequent, and is soon accompanied with some expectoration, which is at first colourless, afterwards assuming a yellowish or greenish hue, and occasionally being streaked with blood; but it rarely puts on the character of the expectoration in the advanced stages of ordinary phthisis. Pain of one or both sides frequently occurs, and occasionally diarrhoea is present. The fever, in the meanwhile, continues without abatement, and is so much out of proportion to the other symptoms of pulmonary affection, that the true character of the disease is liable to be overlooked. In the course of from three to six or seven weeks the patient sinks.

The indications of the pulmonary disease

generally become more evident as the case advances; but still they are often so little marked as to render it doubtful whether the disease is not acute bronchitis or even pneumonia; and when one or other of these affections complicate (as they often do) the tuberculous disease in its progress, the diagnosis becomes extremely difficult. In some cases auscultation assists us materially in distinguishing this form of acute tubercular disease from the two inflammatory affections just mentioned. The upper parts of the chest often give a dull sound on percussion, although the tuberculous matter is less frequently confined to the summit of the lungs in this form of phthisis than in any other; a circumstance which constitutes one of the pathological characters of the disease. The whole of one side of the lungs and even a large portion of both appears to be attacked almost at the same time, giving a dull sound on percussion and bronchial respiration. Under such circumstances it is difficult to distinguish the disease from pneumonia. The negative symptoms assist us: we have neither the crepitant rhonchus which precedes the dull sound and bronchial respiration, nor the characteristic sputa of pneumonia. When, on the other hand, this sudden deposition of tuberculous matter does not take place in the pulmonary tissue, but occurs in the minute terminations of the bronchi and air-cells to a great extent, the disease resembles acute bronchitis more than pneumonia. Here again we derive assistance from the negative symptoms. The bronchial sputa are wanting, and the whole progress of the disease differs from that of bronchitis; there is also, for the most part, an extreme rapidity of breathing, which is not observed in any other disease of the chest. But we repeat that these are cases in which the most attentive observer aided by all our means of diagnosis may be in doubt respecting the real nature of the disease.

The morbid appearances presented after death have been well described by the accurate Louis as consisting of the grey granulations over a greater or less extent of the lungs in some cases; in others, large portions of the lungs appear to be converted into a mass of cheesy-like tuberculous matter, the pulmonary tissue being completely infiltrated with it; a form of tuberculous deposit which Louis considers peculiar to this variety of the disease, that is, when it exists to a great extent. Tuberculous cavities are also found in some cases, but they are generally of small size, only partially evacuated, and have no lining membrane, as occurs in cavities of long duration in the ordinary form of phthisis.

Notwithstanding the rapidity of this febrile form of the disease, it is often attended with those morbid affections of other organs which accompany the common form of phthisis, such as ulceration of the intestines, larynx, and trachea, and the diseased states of the mucous membrane of the stomach and the liver; all which show that the present form of the disease is true to the general character of phthisis.

The diagnosis in the early stage of the disease is often attended with difficulty. The sudden attack of fever with rapid respiration and some cough, occurring in a person of tuberculous constitution, should excite suspicion; and the continuance of the symptoms despite the remedies employed, together with the absence of those symptoms which characterise the common acute diseases of the chest, will greatly assist us. Percussion and auscultation will also lend their aid in many cases. As far as our own experience enables us to determine, this form of phthisis occurs chiefly in young subjects from eighteen to thirty years of age; though it is not confined to this period. Louis gives a case, the subject of which was in the forty-sixth year.

The febrile occasionally supervenes upon the common form of phthisis. In this case the breathing becomes very difficult and rapid; still the chest preserves its resonance, the respiratory sound being accompanied with a slight rhonchus. On examination after death, we find, in addition to the tuberculous excavations existing previously to the acute attack, a large quantity of grey granulations diffused over a great part of the lungs.

It is proper also to remark that the disease which we have described has been considered as a form of pneumonia, the grey granulations being regarded by Andral as the result of acute inflammation of the air-cells; and there will be equal propriety in considering the tuberculous infiltration of the lungs in the other form of acute disease as merely the result of pneumonic inflammation in a tuberculous subject. We do not think it of much consequence to dispute this point. We believe that inflammation in a tuberculous constitution may give rise to the deposition of tuberculous matter in place of lymph, which is its usual product in healthy subjects; and this may be one of the sources of tuberculous disease; but it does not follow that it is the constant or even most frequent cause of tuberculous deposits. A striking objection also occurs to this view of the case, in the fact that pneumonic inflammation is no infrequent occurrence during the progress of the disease, and that this is characterized during life by its proper symptoms, and after death by the usual morbid appearances; one part of the lungs presenting the usual results of pneumonia, while in others we find the tuberculous infiltration which has just been noticed.

5. *Latent phthisis.*—The presence of tuberculous matter in the lungs gives rise, in a large proportion of cases, to those symptoms which are usually considered to indicate the commencement of phthisis; there are, however, cases in which this accidental product may exist for a long time and even to a considerable extent in the lungs, without giving rise to any local symptoms indicative of its presence, such as cough, expectoration, or hemoptysis, but nevertheless effecting its silent work of destruction. It is to cases of this kind that we apply the term *latent*.

Latent phthisis presents itself in two dif-

ferent forms. In one, we have constitutional symptoms, such as fever, night-sweats, emaciation, diarrhoea, &c. without any local indications of the pulmonary disease; or if they be present, they are of so slight a character as to pass unnoticed. The other form of latent disease is still more important, because it is more insidious; being attended neither by constitutional nor local symptoms, until the tuberculous disease has made extensive progress. This form of latent phthisis, therefore, claims our closest attention; because, from the slowness of its course and the more limited extent of the tuberculous disease for a long period, we may possibly be able in many cases to check its further extension, if not to arrest its progress entirely, should we detect it at an early stage.

Of one hundred and twelve cases recorded by Louis, eight belonged to this class; a smaller proportion, we believe, than really occurs. From the history of these cases, and an attentive and minute examination after death, not only of the lungs but of all the other viscera, Louis entertained no doubt of the existence of tubercles during a period varying from six months to two years in different cases, prior to their presence being indicated by cough, the most common local symptom. This perfectly corresponds with our own observation. In tracing back the history of many cases of phthisis, we have obtained satisfactory evidence that tuberculous disease had commenced in the lungs from one to two years before the disease was properly attended to, or its nature understood.

When constitutional symptoms, such as fever and emaciation, occur, there is enough to excite the suspicions of the practitioner, since they cannot exist unless local disease is present; and by an accurate examination of the chest, we shall most probably ascertain that the lungs are the seat of the disease. There is less difficulty in the detection of such cases than of those unaccompanied with either constitutional or local symptoms; but these cases are very likely to escape notice until they arrive at an advanced stage. Still, we cannot easily believe that an attentive observer will not see, in the aspect of his patient, sufficient alteration to arouse suspicions of the existence of the tuberculous diathesis, and lead him to inquire minutely into the condition of the respiratory organs. By means of such inquiries and an examination of the chest, he will seldom, we believe, fail to detect the real nature of the patient's state; but it is the misfortune of such patients that they do not complain, nor give the physician an opportunity of discovering their disease, until it is far advanced. They feel themselves out of health, are weaker, perhaps thinner than usual, they have less energy of mind and less bodily strength; still they are unable to specify any particular ailment. They rally from time to time, and often go on in this way till their looks of ill health fix the attention and excite the fears of their friends, by whom they are at last persuaded to have professional advice.

The physician will often find that his opinion is asked for the first time at a very critical period, both for the patient and himself. If, from the fear of giving alarm, carelessness in his examinations, or ignorance of the patient's real condition, he fails to adopt effectual measures to restore the general health, to prevent tuberculous disease if it has not already shown itself, or to check its progress if it has already taken place, the sufferer is irrevocably lost. In a large proportion of cases, this will, no doubt, occur in spite of all that human art is capable of performing; but there are many instances where the further progress of the disease may be stayed and life prolonged for a considerable time, and others where the usual term of existence will not be much abridged. We are acquainted with some striking examples of persons now living, a considerable portion of whose lungs is incapable of performing its functions, and yet with care they enjoy a reasonable share of health. Under such circumstances lives may be preserved that are of vast importance to their families and to society. Indeed, we are satisfied that there are far more individuals in this state than is generally believed; and it is well known that tubercles are frequently found after death in the lungs of persons in whom their existence had not even been suspected.

As far as our own observation enables us to determine, we think that latent phthisis is most frequently met with after the middle period of life, but no age is exempt from it. Examples are met with in which an attack of phthisis in early life ceases, and years elapse before another attack destroys the patient. We have known recovery from two such attacks, the third proving fatal; the interval between the first and third attack was twelve years. The opinion of Laennec on this subject of recovery from the first attack of phthisis is so important, that we shall here cite his words: "We may indeed say, that the greater number of cases of phthisis are latent at the beginning, since we have seen that nothing is more common than to find numerous miliary tubercles in lungs otherwise quite healthy, and in subjects who had never shown any symptoms of consumption. On the other hand, from considering the great number of phthisical and other subjects in whom cicatrices are found in the summit of the lungs, I think it is more than probable that hardly any person is carried off by a first attack of phthisis. Since I was first led to adopt this opinion on anatomical grounds, it has frequently appeared quite clear to me, from carefully comparing the history of my patients with the appearances on dissection, that the greater number of those first attacks are mistaken for slight colds, and that others are quite latent, being unaccompanied with either cough or expectoration, or indeed with any symptom sufficient to impress the memory of the patients themselves."\*

We venture, however, to express our firm belief that the disease would be more fre-

quently detected in its early stages, and many valuable lives saved, by a due attention to those signs of tuberculous cachexia which present themselves in such patients. We have already stated our conviction that the great cause of our want of success in the cure of tuberculous disease, arises from the advanced stage at which its real nature is discovered, and from the late period at which the physician is consulted. If Laennec's opinion be correct, that few die in a first attack of phthisis, we have still more reason to hope that the disease may be cured, that is, that a second attack may be prevented by improving the patient's general health, by removing, in fact, the tuberculous cachexia, and by placing him, when possible, under the most favourable circumstances for the prevention of a relapse into his former state.

Tuberculous disease is rendered latent, or is at least masked by a peculiar condition of the system in some cases; and in others by the presence of other diseases. Pregnancy appears to retard if not to suspend the progress of phthisis, and it is frequently observed that the disease advances with great rapidity immediately after parturition. The catamenia generally cease when the disease has made some progress; although they continue in a few rare cases until death. An attack of mania in a phthisical patient has been followed by the suspension of the pulmonary disease; which, however, rarely fails to carry off the patient ultimately, whether the attack of mania has ceased or not. The complication of dyspepsia with tuberculous disease is not an infrequent cause of the latter being overlooked, the dyspeptic symptoms being more evident than the phthisical. The aspect of the patient in such cases is pale and unhealthy; he gets thinner and weaker; the food which he takes neither affords him nourishment nor strength; and yet he has no evident ailment but what is referrible to the deranged state of the digestive organs. In such cases there may be no cough, no fever nor expectoration to excite our fears for the safety of the patient; while at the same time tubercles are present in the lungs. We have seen a patient of this kind, when asked any question respecting the state of his lungs, strike his chest, and confidently affirm that all was right there; although his lungs were tuberculous to a considerable extent at the time. This is the form of the disease which has been termed "dyspeptic phthisis."

Diarrhoea is another disease which sometimes disguises phthisis, and its effects in suspending all the usual symptoms of pulmonary affection are often remarkable. We have known more than one example of extensive tuberculous disease of the lungs being detected on dissection, when the cause of death has been looked for in the intestines. It is true that these were cases in which the early history of the disease was disregarded, but they serve at least to show the power of diarrhoea in masking extensive affections of the lungs.

It is enough, however, that such facts

\* Forbes's Translation, 2nd edition, p. 358.

should be known, in order that they may prevent the younger members of the profession from falling into the error of overlooking the disease of most importance, and of mistaking for the chief and primary affection, that which is only secondary both in occurrence and in consequence.

#### SECT. IV.—OF THE PARTICULAR SYMPTOMS AND DIAGNOSIS OF PHTHISIS.

After the general sketch which we have given of the usual course of phthisis, and of the rarer forms which it assumes, it will be useful to take a more minute survey of the particular symptoms which attend the disease and characterise its different stages. This will enable us more readily to attach the proper value to these symptoms when considered individually, and likewise to determine their importance as a means of establishing the diagnosis of phthisis. We shall then notice the assistance afforded by auscultation, and by certain other physical signs, in attaining the same important end.

**I. SYMPTOMS.**—We have already seen how variable the symptoms are in different cases, as regards the time of their appearance, the order of their succession, and the degree of their severity. In analysing them more closely, we shall also find that there is scarcely one, even of the leading symptoms, which may not be wanting; and it has even been stated that cases have occurred in which pulmonary disease has proved fatal almost without any indication of its existence as a local disease. This, however, is by no means in accordance with our own experience; certainly we have never met with such a case, nor even with one at all approaching to it; nor can we easily believe that tuberculous disease can run its course without affording sufficient indications of its existence. If there be neither cough nor expectoration to assist us in establishing our diagnosis, we shall find hurried breathing; and if regular hectic be absent, there will still be the rapid pulse, or the frequent chills, the night perspiration, the diarrhoea, and emaciation: more or fewer of these are always present, and, together with the peculiar cachectic character of the countenance, will enable us to detect the real nature and seat of the disease. There will at least be found enough to excite the suspicions of the observing practitioner, and when these are once aroused, the physical signs which 'disease of the lungs always affords, will soon assure his mind respecting the real nature of the malady.

It is a matter of great importance to be able to mark the commencement of tuberculous disease of the lungs by its external manifestations, and distinguish it from the other diseases with which it is liable to be confounded; since, in a very large proportion of cases, it is only in the early stage that we can hope to effect a cure, or even to arrest the further progress of it. The symptoms by which the first existence of pulmonary tubercle is characterised, are unfortunately very equivocal; added to which we are often baffled by the

unwillingness of the patient and his friends to aid us in our inquiry. Yet, notwithstanding this doubtful character of the early symptoms, and the obstacles which often present themselves to us in our investigations, we fear that our own neglect in acquiring information respecting the past and present condition of the patient's health, and our inattention to the existing indications of disease, lead us, far more frequently than the real obscurity of the case, to allow the early stages to pass on undetected.

When we are consulted by a person whose condition induces us to suspect the existence of tubercles, our examination should be full and complete. The general aspect deserves particular attention; the past health and occupations; the diseases which may have previously existed, and the family diseases also (when possible) should be ascertained; while the state of the different functions, but above all the condition of the respiratory organs, should be investigated by all the diagnostic means in our power. The form and motions of the chest, the sounds elicited by percussion, and those produced by the ingress and egress of air into the lungs during inspiration, speech, and cough, must all be taken into account to enable us to estimate the value of particular symptoms,—or, in the absence of these, to form a probable opinion of the state of the lungs.

There is no one local sign or symptom to be depended on in this early period of tuberculous disease; but by a careful analysis of the whole of them, and by availing ourselves also of the negative symptoms, as regards other pulmonary diseases with which phthisis is liable to be confounded, we shall, we believe, rarely err in arriving at a correct diagnosis, even at a very early stage of the disease.

**Cough.**—This is the first symptom which claims our attention, being, for the most part, the earliest evidence of pulmonary irritation, and the first circumstance which excites the attention of the patient or his relatives. During the first weeks or months, it is usually a slight dry cough, occurring chiefly in the morning on the patient getting up, or on his making any bodily exertion during the day. In this state it is scarcely noticed by the patient; it appears to him to be of no consequence; to arise from some irritation in the region of the larynx; and he rarely suspects that it can have any connection with the state of the lungs. Its continuance in this trifling degree for weeks or even months, without any expectoration, is another circumstance in the history of the tuberculous cough which deserves attention. By degrees, it occurs occasionally during the day, especially after any exertion, such as running up stairs, speaking or reading aloud for some time, laughing, &c. and after a longer or shorter time is attended with the expectoration of a transparent frothy fluid resembling saliva, which at first appears to come from the fauces.

In general, the cough is found to increase as the pulmonary disease advances, being usu-

ally in proportion to the rapidity of its course. In some cases, however, it is very slight through the whole disease, and, in a few rare instances, it has only appeared a few days before death, and this in cases where tuberculous excavations of the lungs existed to a considerable extent. Louis gives two well-marked cases of this. Now, if it could be wanting under such circumstances until within a few days of death, it is reasonable to admit that it might be wanting altogether; and cases are on record in which it has been entirely absent. "It is not sufficiently known," says Portal, "that the disease can exist without the slightest cough: the lungs of consumptive patients have even been destroyed by suppuration, without their having experienced the least degree of cough."\* Lieutaud, Morgagni, and others, have mentioned similar cases.† We have never found the cough entirely wanting, but have known it so slight that it has failed to attract even sufficient attention to alarm a very nervous patient or his watchful friends.

It occasionally happens in the progress of chronic phthisis, even during the existence of tubercular excavations, that both the cough and expectoration cease for weeks, when the patient is placed in favourable circumstances; but both are usually brought back again by the slightest attack of catarrh.

The cough, on its first appearance, is observed only in the morning: by degrees it increases, and is then excited by slight bodily exertion: in its later stages it is observed after meals, especially after dinner, on getting into bed at night, or at any time when the horizontal position is assumed. As the disease advances, it is common at all times, and without any evident cause of excitement; but it is most frequent in the mornings and evenings; the sleep is often broken by it during the night, and by day it frequently brings on pain of the chest, and occasionally vomiting. In the latter stages it is followed by a degree of breathlessness amounting in some cases to a sense of suffocation, which is very distressing. Such are the usual characters of the cough which is indicative of tubercular disease of the lungs in its various stages, when not complicated with other morbid states of those organs. To these may be added another circumstance deserving notice, that no cause can in general be assigned for its first occurrence; it is sufficient, however, to know, that while cough is one of the earliest indications of pulmonary tubercle, it is among the most constant attendants during its progress, and one of the most distressing symptoms to the patient and to the feelings of his friends.

The cough which is most liable to be confounded with the tubercular, is that which accompanies catarrh, although in general they may be distinguished from each other. The catarrhal cough is characterised by the follow-

ing circumstances. Its first attack is well marked, and can on most occasions be traced to evident exposure to a cold or damp atmosphere, checked perspiration, or other causes. The cough is deep, implicating the whole respiratory muscles, and is attended with general soreness of the chest, frontal headach, and other symptoms of catarrh. The difference in the expectoration which attends these coughs is equally well marked. The catarrhal cough, although at first dry and hoarse, is soon accompanied with expectoration, at first colourless, but shortly becoming opaque; then assuming a yellowish, mucous, and even muco-purulent character. From this time the cough and expectoration generally diminish, and under ordinary circumstances soon cease.

Such are the characters and usual progress of the cough of acute catarrh; but when the disease assumes the chronic form,—the principal and almost only remaining symptom being cough with more or less expectoration,—the distinction is attended with greater difficulty: yet still both the cough and the expectoration may in general be distinguished in cases of pure catarrh. It is when they are complicated that the difficulty arises.

When, from the continuance of the cough or its doubtful character, we suspect some cause beyond catarrh, we should inquire carefully into the patient's state before the occurrence of the catarrh. If he had a slight morning cough previously, or shortness of breathing, or hæmoptysis, there are strong grounds to suspect that the continuance of the catarrhal symptoms is partly dependent on tubercular disease, more especially if the patient is young. At a more advanced period of life, we often meet with dyspnoea and a morning cough, the consequence of the dry or pituitous catarrh complicated with emphysema of the lung.

The cough which comes next in importance to the catarrhal cough in a diagnostic point of view, is one which has not inaptly been termed the "stomach cough." Gastric irritation is frequently attended with cough, in some respects not unlike the early tuberculous cough. A little attention, however, will soon enable us to discriminate them. In general, the cough which attends gastric irritation is louder and harder than the phthisical cough, and frequently comes on in paroxysms or fits. The sensation which excites it is felt deep in the epigastric region; and the irritated state of the stomach is generally rendered manifest by other symptoms. The tongue is red at the point or edges, generally furred in the centre, and often dry on awaking in the morning; there is thirst, some quickness, and a contracted state of the pulse; cold extremities during the day, and often a preternatural heat of the hands and feet during the night; the bowels are generally costive, and the urine is high-coloured. There is frequently joined to these symptoms frontal headach, especially in the evening, with a degree of irritability of temper which is unusual to the patient. If accustomed to mental occupations, he finds himself less disposed and

\* Vol. ii. p. 123.

† Hist. Anat. Med. lib. ii. ob. 384. De Sed. et Caus. Morb. Epist. xix.



less able to exert his mind. The expression of his countenance also changes remarkably—he becomes pale and sallow, and his features are sunken. He has the aspect of ill health; he feels unwell, and yet, on being questioned, he cannot fix upon any local complaint. This state often continues for a long period, and in many cases without much loss of appetite,—a circumstance which tends to deceive the patient respecting the seat and nature of his malady.

On a more minute examination, we shall find that the disease is seated in the digestive organs, and that the cough and other symptoms will gradually vanish by proper treatment, and the patient's health be frequently restored in a wonderfully short space of time, especially if he happen to be young. A gentle antiphlogistic treatment, and a strict adherence to a mild diet, will soon show the nature of the disease, by the marked and speedy relief which it will afford; and this, in truth, will be at once the best test of the accuracy of our diagnosis and the soundness of our pathological views as to the cause of the cough, &c. Even when gastric irritation is complicated with incipient phthisis (a very frequent occurrence), our treatment must be directed to the cure of the former, as the best means of enabling us to arrive at a correct knowledge of the patient's condition.

There is another form of cough which properly belongs to the stomach, as it originates in, and is kept up by, a deranged state of that organ. This cough occurs later in life. It is accompanied with a considerable expectoration of tenacious mucus, which, from its occurring chiefly in the morning, has received the name of "morning phlegm." It is produced by too full living, and generally accompanies the last ten or fifteen years of the gourmand's life, and is easily distinguished from the tubercular cough.

Both these coughs, however, deserve attention, not only on their own account, but more especially when they occur in a tuberculous constitution. The first form of the gastric irritation, when of long duration, greatly favours the formation of the tubercular diathesis; and may thus prove fatal from its nature being mistaken and its treatment misdirected. The second occasionally masks tuberculous disease occurring at a more advanced period of life.

Diseases of other abdominal viscera are often attended by a symptomatic cough, which, without attention, may be mistaken for a pulmonary cough. Irritation of the liver and duodenum, intestinal worms, and irritation of the uterus often give rise to it. The cough which is present in chlorotic patients, and which is probably dependent on functional derangement of the uterus, may in general be easily distinguished from the phthisical cough, by the other symptoms with which it is associated, and by the facility with which it yields to a mode of treatment which would have little effect in relieving the latter. It must be kept in mind, however, that young females of a tuberculous constitution are the persons most liable to chlorosis, and on this account their

cough must not be treated too lightly, nor a prognosis given without circumspection.\*

Another form of cough which has been confounded with the tubercular is that which is termed "nervous cough." The character of this latter, the periods at which it occurs, its mode of attack and disappearance, all differ from those of the tubercular cough. The nervous cough occurs at irregular times throughout the day, and whatever agitates or affects the patient's mind is liable to bring it on. It has a peculiarly sharp, barking sound, is repeated in quick succession at short intervals, and often continues an hour almost without any intermission. It is also in general accompanied with other indications of nervous irritability, and not unfrequently with evident hysteria, of which indeed the nervous cough may in general be considered a modification, especially as young nervous females are most subject to it. In all its essential characters, therefore, the nervous cough differs from the phthisical; and although in pure cases there is little danger of their being confounded, it is far otherwise when they are complicated. In truth, all these coughs have their own peculiar characters, by means of which they may, with ordinary attention, be readily distinguished when they are uncomplicated with each other. It is when they exist in the same individual that the difficulty of discrimination arises, and such combinations frequently occur.

The tubercular cough is very often complicated with the catarrhal. The former may, and sometimes does, exist for some time without attracting attention, when an attack of catarrh produces its usual effects—masking for a time the phthisical cough which preceded it; or the catarrhal may have been the first in occurrence. Whichever is the case, after the catarrhal cough has run through its usual stages, a cough remains which is neither catarrhal nor tuberculous, but partakes of the characters of both; and it is only by careful observation that we are enabled to determine to which it chiefly belongs. Indeed the cough alone will not always enable us to do so. All the other circumstances of the patient must be taken into account:—his previous health, his present state and appearance, his hereditary predisposition, &c., must be considered; as each of them will assist us in determining the nature of the affection, whether it be an unmixed chronic irritation of the bronchial membrane, or an irritation kept up by tubercles.† If tubercles are present, we shall find by attentive observation that the cough varies in its character, being at times more allied to the tuberculous, and at others to the catarrhal cough, especially on any exposure to a cold or humid atmosphere.

The stomach and hepatic cough may in like

\* De Haen has noticed the various abdominal diseases which produce cough. *Vid. Rat. Medendi*, lib. iii. p. 375.

† We refer the reader to the excellent articles, in the present work, on CATARRH and BRONCHITIS, for the characters of the cough which attends these diseases.

manner occur in tuberculous subjects; and we may for some time be unable to determine the seat of the irritation which produces it. The gastric cough, however, is generally under control, and is speedily relieved, if not removed, by regimen and such means as are known to relieve gastric irritation.

Again, the tuberculous cough of young hysterical or nervous females is often greatly modified; the cough sometimes assuming the nervous character to such a degree as to pass entirely for that. Both the patient and her relatives are generally willing to believe that the cough is purely nervous, and anxious to impress upon the mind of the practitioner that it is so. We have known mistakes of this kind, and fear that they are not infrequent; we therefore caution our younger brethren not to allow themselves to be deceived by the too favourable report of friends, in their anxiety to make the case appear what they wish it to be; nor to rest satisfied with the cough which they may hear at a forenoon visit, but inquire into its character when the patient gets out of bed in the morning and retires to rest at night, also during exertion, and in a state of perfect quiet. Whenever doubt exists, it is misplaced kindness to omit a full examination from a fear of alarming the friends or depressing the spirits of the patient.

An examination of the chest, when performed with caution and judgment, will be more easily submitted to by the patient, and prove far more satisfactory at this period of the disease, than when it is further advanced; at any rate, if mischief exists, it cannot be too soon detected, even at the risk of exciting alarm in both the patient and his friends. We have never had occasion to regret insisting upon an examination, though we have regretted its postponement. After such an investigation the physician can speak with decision respecting the measures which it is necessary to adopt; and in place of the luke-warm and vacillating directions which are too often given in such cases, he can impress with firmness upon the minds of the relatives the necessity of a strict adherence to such a mode of treatment, and such prophylactic measures, as the case may require and the circumstances of the patient admit: we say *prophylactic* treatment, because we are supposing the case to be in that stage in which the chief objects of treatment are to correct the tuberculous diathesis by general measures, and prevent a further deposit of tuberculous matter by avoiding those causes which are known to irritate the respiratory organs.

*Dyspnoea.*—This symptom, although never wanting, varies greatly in the degree of its intensity in different cases. In some instances it occurs early in the disease, being among the first circumstances which attract the patient's attention; and it is one of the most constant and remarkable symptoms in one form of the disease which we have already noticed, viz. *Febrile Phthisis*. More frequently it is not troublesome until the malady is far advanced; and it is generally in the very last stages only that it becomes very distressing. When the

tuberculous disease makes slow progress, the dyspnoea is little remarked; and in persons who, from their quiet mode of living, use little exercise, it is scarcely noticed even when the respiration is more than double its usual frequency. We have seen the respiration in a consumptive patient habitually thirty in the minute, although the circumstance was never remarked by the patient himself. In such cases the oppression in breathing experienced during motion is very often attributed to debility. Indeed, it is by no means an infrequent occurrence to find the patient unwilling to admit the existence of dyspnoea until minutely questioned on the subject. There is often among consumptive persons a jealousy of being interrogated on any symptom which seems connected with pulmonary disease; and they not uncommonly conceal such symptoms from the physician, who must, if he desires to arrive at the truth, put his questions with great caution, and without appearing to attach any importance to them.

Although we shall not, we believe, err far in stating that the degree of dyspnoea or hurried respiration (for we class both under the same head) will generally be found proportionate to the rapid progress and extent of the tuberculous disease of the lungs, still this will not always be an invariable occurrence. We are not yet acquainted with all the causes of dyspnoea; but one of them is often to be found in a feeble heart, which is easily oppressed, and in this state gives rise to it. Of the one hundred and twenty-three cases reported by M. Louis, three only presented examples of severe dyspnoea; and a careful examination of the whole contents of the thorax after death, in these cases, detected nothing to explain it. A degree of congestion of the lungs commonly exists, we believe, in persons of a tuberculous constitution, both before and after the formation of tubercles, and may be one cause of dyspnoea; and hence we frequently find that an attack of hæmoptysis, or venesection employed to subdue this, relieves the dyspnoea for a considerable time. On the other hand, it not unfrequently happens that the origin of the short or difficult breathing is dated from an attack of hæmoptysis: we have frequently observed this, but are unable to account for it. We allude to the protracted dyspnoea:—that which immediately succeeds the attack of hæmoptysis most probably depends upon the effusion of blood into the pulmonary tissue, and the consequent compression and obliteration of the air-cells to a greater or less extent.

Dyspnoea, therefore, although not much to be relied on as an indication of the very early stage of phthisis, is frequently present, and should always be a subject of inquiry; indeed it will be found more often, we imagine, than is generally believed. It is chiefly during exertion that the oppression of breathing is experienced, and as it differs little from that which in a slight degree always accompanies such exertion, it seldom attracts attention. Being slow and gradual in its increase, and, like many other morbid states, unattended with pain, it is

little noticed until it has become very considerable. But since tubercular disease of the lungs cannot exist to any extent without more or less dyspnoea, the presence of this symptom along with emaciation should lead us to examine the chest with care, even were there no other indications by which phthisis might be detected.

*Expectoration.*—When the cough has continued for some time, it becomes gradually softer, and a transparent, ropy fluid, resembling saliva, is expectorated, becoming by degrees more stringy and tenacious. After a longer or shorter interval, varying remarkably in different cases, specks of opaque matter appear mixed with the transparent frothy fluid. These specks vary in appearance, being at one time white, at another yellow or even approaching to green, and again very frequently of an ash colour, partly sinking in water in little masses, and partly floating in it in the form of striae.

Immediately before, or at the time of this change in the character of the expectoration, a little blood frequently appears in it. As the disease advances, the transparent salivary portion diminishes, while the opaque part increases and gives a more homogeneous aspect to the expectoration, which is now of a yellowish colour, and is brought up by the cough with more ease and in more distinct masses. At a later period it is of an ashy colour, and is ejected in separate, rounded, flocculent-looking masses, enveloped in a certain proportion of the transparent ropy fluid. If thrown into water at this period, some of these masses sink to the bottom; others are suspended at different depths, connected together by the ropy, fluid expectoration before mentioned.

The period of the disease at which this last change in the character of the expectoration takes place varies in different cases, and occasionally occurs a few days only before death. But more generally these ash-coloured, distinct masses are expectorated for many weeks or months before death, accompanied with more or less of the mucous fluid in which they frequently float. Bennet\* mentions these ash-coloured sputa as occurring, in hopeless cases, towards their termination. In some cases the expectoration continues to retain the yellowish puriform character; and in a still smaller proportion the semitransparent tenacious expectoration continues till within a few days of death, forming a gelatinous-looking mass, separated with difficulty from the vessel which contains it. During the last days of life the expectoration appears in a more dissolved state, and sometimes of a darker hue; about this period also, and often long before, it assumes a very fetid odour; finally it diminishes considerably, and often ceases entirely some days previous to death.

Such are the changes in the character of the expectoration which are generally observed in phthisis; but it is right to state that they are by no means constantly noticed. The periods in the progress of tubercular phthisis at which

expectoration commences, and at which occur the various changes we have related, differ, as we have seen, in different cases. The nature, also, of the sputa is greatly changed by accidental causes, as by attacks of catarrh and of pneumonic inflammation.

Few of the symptoms which attend phthisis have excited more notice than the expectoration, or were formerly considered of equal importance in distinguishing it from bronchial disease. Since the real character of tubercles has been more fully demonstrated by modern pathologists, and we have become acquainted with the physical signs by which the existence of pulmonary disease is more certainly determined, the expectoration has been much less regarded as a means of discriminating phthisis. The presence of pus, which was so carefully looked for, and to distinguish which so many experiments were made, is now well known (and indeed has been so since the days of Hoffmann and De Haen) to be present when bronchial disease only exists; and we also know that pus in the expectoration does not form an essential character of tubercular phthisis. But although no physician of the present day would think of relying on the appearance of the expectoration as a test of the nature of the pulmonary affection, still it is interesting to know what characters exclusively belong to it when it accompanies tubercular disease. The transparent, frothy, tenacious sputum, though it often indicates the presence of tubercles, is evidently a secretion from the bronchial membrane, and may occur independently of any tubercular disease. The same may be said of the yellowish-green expectoration, which is often discharged in large quantities towards the termination of slight bronchitis or in chronic catarrh; and there is no doubt that the same membranes produce the greater part of the expectoration in tubercular disease of the lungs.

There are two characters, however, which may be considered peculiar to the expectoration attending tubercular disease; the striated state of the expectorated mass with a mixture of whitish fragments in it, and the ash-coloured globular masses which are observed in the more advanced stage of the disease. This last we have never met with unaccompanied with tubercular disease; but even this form of expectoration has been found by Chomel and Louis in two cases during the last days of life, where neither tubercles nor tubercular excavations, nor dilated bronchi were detected after death. The very circumstance, however, of its having been found in two cases only, by these two accurate observers, shows how very generally it is connected with tuberculous disease. The different characters of the expectoration which we have already noticed present themselves, for the most part, as has been before stated, in the course of pulmonary phthisis. They occurred in all the cases described by Louis, with three exceptions, in which the ash-coloured masses never appeared, the expectoration continuing semitransparent, or of a slightly yellowish hue, to the last.

\* *Theatrum Tabidorum*, cap. xxiv.

The quantity of the expectoration varies remarkably in different cases, and is by no means to be considered commensurate to the extent of pulmonary disease. Occasionally the quantity is extremely small, although after death large excavations (of recent formation) are found. On the other hand, and even in the early stages, while the expectoration is still transparent, the quantity is often very great, especially when the disease makes rapid progress. In a few rare cases expectoration has been entirely wanting; Portal says that "sometimes this purulent expectoration is wanting, although the lungs be filled with abscesses."\* We have only met with one decided case in which this continued to the last;—the lungs on one side were found, on examination, converted almost entirely into a mass of tubercular disease, containing numerous small tubercular vomicae and one of considerable size: the upper part of the other lung was also tubercular, and some of the tubercles were softened. The cough in this case was so slight as scarcely to be remarked; but the rapid pulse, the quick breathing, the night-sweats and emaciation were more than sufficient to indicate the nature of the disease, independently of auscultation, which left no doubt on the mind:—there were, however, circumstances in the case which, without the assistance of auscultation, would have thrown a shade of obscurity on its nature. In other instances large excavations have been found communicating freely with the bronchi, although, for a considerable period before death, neither cough nor expectoration were present.†

In regard to the sources of the expectorated matter, it is evident that when the tubercles are still in a crude state, it must be supplied by the bronchial membrane. The chief seat of tuberculous matter has been demonstrated by Dr. Carswell to be the air-cells and extreme terminations of the bronchi; and we can easily understand how this, when accumulated in any quantity, must prove a source of irritation, and that this irritation should be first communicated to the mucous membrane in the immediate vicinity of the tuberculous matter. As the small masses of tuberculous matter contained in the air-cells accumulate, the bronchial membrane and the pulmonary tissue become excited and irritated; a degree of inflammatory action most probably takes place, and a sero-purulent fluid is poured out, by which the tuberculous matter is penetrated and softened. The surface of tubercular excavations affords an additional secretion of matter; the quantity supplied from this source would appear in some cases to be great, whereas in others it is extremely small; indeed we have frequently been surprised at the small quantity of the sputa compared with the extent of the caverns.

Reviewing the facts which have been stated

\* "Quelquefois ce crachement (pus) n'a pas lieu, quoique les poumons soient pleins de foyers de suppuration."

† *Andral, Clinique Médicale, t. ii. obs. xi.*

in this and the preceding sections respecting the varying characters of the expectoration, the uncertainty of its changes according to the progress of the disease, and its occasional absence altogether, it follows that we must not place much reliance on it, either in a negative or positive sense, as a diagnostic symptom, especially in the early stages of the disease. In conjunction with other symptoms, it has its value in the more advanced stages, in enabling us to ascertain the presence of tubercular disease in complicated cases, and the changes which occur in the ordinary progress of phthisis.

*Hemoptysis.*—Hemoptysis has been long regarded as a frequent cause of phthisis, from its being often observed to precede the more evident symptoms of the disease. A more correct knowledge of the nature and causes of hemoptysis has placed it among the consequences of the pathological conditions of the lungs which precede and accompany the development and progress of tubercular disease. It is rarely, if ever, a cause of phthisis, except in a tuberculous subject. It may indeed be rendered a *determining* cause, by the debility which it induces when very copious, or by the sanguineous depletion carried to a great extent for the purpose of suppressing it; the effusion of blood also into the pulmonary tissue may become a source of irritation, and even form the nidus for the primary deposit of tubercle, as M. Andral has shown.\* Although, therefore, hemoptysis is in general to be regarded as an indication of the presence of tuberculous disease in the lungs, it may in some cases be more intimately connected with its production.

It is certain that pulmonary hemorrhage occasionally occurs in a state of apparent health, being the first cognizable symptom of the approaching mischief. M. Andral relates some cases of hemoptysis, in which he thinks he had evidence that no tubercles existed in the lungs previous to the hemoptysis, because the patient showed no appreciable symptoms of their presence; and he cannot without difficulty believe that tubercles can exist to a degree sufficient to give rise to hemorrhage, without being preceded by cough or some other indication. In such cases he considers that pulmonary apoplexy takes place, the effused blood becoming the matrix for tubercular deposits.† But to produce this effect the effusion must take place in a tuberculous constitution, which, indeed, M. Andral admits. He gives a case illustrative of his views, which, while it shows that the effused blood may be the primary seat of pulmonary tubercle, supports the opinion that tubercles would only have been formed in a tubercular subject. It is a case where tubercles were found in a mass of effused blood, and in no other part of the lungs; but the patient had tubercular peritonitis at the same time.‡

Although, therefore, hemorrhage from the

\* *Path. Anat. Transl. vol. ii. p. 553.*

† *Loc. cit.*

‡ *Clinique Médicale, tom. ii. p. 39.*

lungs may, in a few rare cases, give rise to phthisis, it is only to be regarded, even in these few instances, as an occasional cause. It is generally to be considered symptomatic of the existence of tubercles, and is, in this point of view, a most important diagnostic symptom.

Hemoptysis is, no doubt, occasionally idiopathic, or at least totally unconnected with any previous disease of the lungs. In such cases, if not caused by local injury, it is either vicarious of the catamenia, or produced by a plethoric state of the system, the consequence often of suppressed sanguineous discharges, such as the hemorrhoidal in persons advanced in life, and epistaxis in youth; and it is occasionally dependent on disease of the heart. In all these cases a temporary state of plethora of the lungs most probably occurs, and a free pulmonary hemorrhage may even prove beneficial. In phthisical cases we believe that a general plethora of the lungs often exists, and is the determining cause both of hemoptysis and of tubercles; and that, even in such cases, the discharge of blood from the overloaded vessels may do good. In a few cases, hemoptysis appears to be the effect of the severity of the cough.

Portal remarks that those who habitually spit blood rarely become phthisical, and cites the following observation of Baillou: "*Magnas excretionis sanguinis ex pulmone minus esse periculosas quam parvas.*" This remark is most probably founded on the circumstance that idiopathic hemoptysis, connected simply with congestion of the lungs, is generally abundant; as we have found in the majority of the cases of this kind which have come under our observation. But at the same time it must be admitted that cases of idiopathic hemoptysis are very rare, compared with those in which it is to be regarded as dependent on, or immediately connected with, tubercular disease of the lungs. M. Louis, from careful and extensive observations on the occurrence of hemoptysis in different diseases, came to the conclusion that, with the exception of some cases in which the hemorrhage depended on external injury, or where the catamenia were suddenly suppressed, hemoptysis indicates, with a high degree of probability, the presence of tubercles in the lungs. Our own opinion corresponds with that of M. Louis.

The influence of sex and age in the production of hemoptysis is not undeserving of attention. In the practice of M. Louis it occurred more frequently in females than in males, in the proportion of three to two. The age of the females was most commonly from forty to sixty-five, that is, after the period at which the catamenia usually cease; the reverse, Louis remarks, of what should have occurred had the hemoptysis been an effect of amenorrhœa or a substitute for the suppressed catamenia. We shall probably find an explanation of this in the circumstance that females very often become full and plethoric at this age, and hence more

liable to attacks of inflammation and hemorrhage than at any other period of life. We have remarked this particularly in females who had been subject to very copious catamenial discharges. Among men, Louis observed hemoptysis to occur nearly in the same proportion at all ages. The frequency of its return was generally in proportion to the length of the disease; and when copious, it rarely occurred oftener than twice or thrice in the same individual. In the whole of Louis' cases, it occurred in a greater or less degree in two-thirds; and the numbers in which it was inconsiderable were nearly equal. In some persons it is a frequent symptom during the whole course of the disease; in others it is never present. In the phthisis of advanced life and in young phthisical children it is rare, and occurs generally towards the close of the disease. Hemoptysis may appear at any stage of phthisis; in a few rare cases it is, as we have remarked, the very first circumstance which excites alarm, occurring even before the cough. When it preceded the other symptoms, M. Louis observed that it came on suddenly in the midst of perfect health and without any appreciable cause; but neither of these remarks is quite in accordance with our own observations. We have found more frequently that the aspect of the patient was by no means indicative of perfect health, although he had not complained; and we have more frequently known the hemorrhage to succeed bodily exertion, such as running, ascending heights, or long speaking, than when no such evident cause had occurred; and in these cases we have remarked that the hemoptysis did not appear during the exertion, but some hours after it. One young man, for example, had made considerable exertion in ascending a hill; he returned to dinner, and while dressing was attacked with hemoptysis. Another, after great exertion in endeavouring to catch a horse, was affected in a similar manner a few hours after; and a third, after delivering a lecture in the evening which required considerable effort, had an attack of hemoptysis during the night.

There would appear to be a constitutional disposition to hemoptysis in some persons, and even families. We have known several members of the same family die from the pulmonary hemorrhage during the progress of phthisis.

The quantity of blood discharged at one time differs greatly; in some instances not exceeding a single mouthful, and in others amounting to a pint or more. When it is slight, it is often confined to the mornings; and when it proves fatal, which is generally towards the termination of the disease when the structure of the lungs is extensively destroyed, several pints may be suddenly discharged. In this latter case, the hemorrhage arises, for the most part, from an opening occurring suddenly in a large artery implicated in the tuberculous disease.

As a diagnostic symptom, hemoptysis is very important. We have already stated the very large proportion of cases in which it has

been found to indicate tuberculous disease. Its occurrence, therefore, before or soon after the commencement of the cough, renders the presence of tubercles highly probable.

*Pain of Chest.*—Acute pain rarely attends the early stage of phthisis; but some pain is frequently experienced in the upper parts of the chest and shoulders, although it is scarcely noticed by the patient unless inquiry be made on the subject, as it is generally attributed to rheumatism. As the disease advances, the pain is more frequent, and we have usually found it more severe on that side on which tuberculous disease existed to the greatest extent.

We have noticed these slight pains in the clavicular regions, because in a doubtful case their presence would tend to increase our suspicions of the presence of tuberculous disease; especially when the other common symptoms are in accordance with this view, such as the tubercular character of the patient, the short cough, &c., and when as yet we have no positive sign to determine our diagnosis.

When severe pain has been experienced in the epigastric region and towards the back, adhesions have been found between the diaphragmatic and pulmonary pleuræ; but pains are often felt when an examination after death discovers no such adhesions to enable us to account for them. During the last months of phthisis, pains of one or both sides often add greatly to the patient's sufferings; indeed there are few cases in which they do not occur to a greater or less degree at this period of the disease.

The pain of the chest which attends catarrh is essentially different in its character; it is referred generally to the centre of the chest, between the sternum and the spine; it is chiefly felt during cough, and is described rather as a sense of soreness than of pain.

*The Pulse.*—Although the state of the pulse might be considered under the head of hectic fever, it perhaps deserves a distinct notice in this place, as much importance has been attached to it in phthisis. Like every other symptom, it varies very remarkably, being modified in each individual case by certain physiological and pathological conditions, which have no direct connexion with the tuberculous disease. Generally speaking, the pulse of the phthisical patient is frequent, especially after the morbid condition of the lungs is fairly established; and in doubtful or obscure cases, a frequent pulse (by which we mean one of eighty or upwards in the adult) would add strongly to our suspicions of the existence of tubercles in the lungs.

But, before we form any judgment as to the frequency of the pulse, its natural state should, if possible, be ascertained in every case. Eighty pulsations in the minute may be the natural number in one patient, and yet constitute a frequent pulse in another, whose natural pulse is sixty or sixty-five. In our opinion, the average natural frequency of the pulse in adults is generally estimated too high by authors; but

be that as it may, its frequency should never be decided on until its natural state be first known. Many persons of the tuberculous constitution have habitually a slow, languid, and feeble circulation, which we have found continue with little variation, when there was clear evidence of extensive tuberculous disease in the lungs.

Without desiring, therefore, to fix the value of the state of the pulse as a sign of incipient phthisis, we regard it as always deserving the attention of the physician. A frequent pulse, in a tuberculous subject, even taken as an isolated symptom, is one which should excite suspicion; and when accompanied with other symptoms indicative of pulmonary disease, it adds strongly to the presumption that mischief has already commenced. On the other hand, we consider a slow, or rather a natural state of the pulse, as a favourable and encouraging symptom, inasmuch as it is usually associated with a condition of the system which is favourable to the patient's recovery; while it is some proof that the lungs are not extensively tuberculous, and that there is neither much pulmonary nor gastric irritation.

*Hectic Fever.*—The fever which attends phthisis is usually slow and insidious on its first onset, and is, for some time, so slight as often to escape observation. Like some of the other symptoms which we have described, it varies greatly in degree in different cases throughout the whole course of the disease, and is more modified by collateral and accidental affections than perhaps any other symptom. The accidental occurrences to which we allude, are inflammation of the respiratory organs, and gastric and intestinal irritation. These appear to have more influence in exciting and modifying the fever than the primary tubercular disease, which frequently exists for a long period without being attended by an appreciable degree of fever. In stating this opinion, however, we do it with some hesitation, seeing that it is opposed in some degree to the views of that accurate pathologist Louis, who attributes the earlier febrile symptoms of phthisis to the presence of tubercles.

The first febrile sign remarked by the patient is a sensation of chilliness towards the evening. This sensation increases as it continues to recur, amounting often to a slight shivering; it is then usually succeeded by heat of skin during the night, the heat being particularly felt in the feet and hands, which are for the most part habitually cold in tubercular patients. After a time morning perspirations are found to succeed the hot stage. As the disease advances, these paroxysms of fever become stronger, especially the hot stage, and the heat is more generally diffused over the whole surface.

*Perspirations.*—Although this very prominent symptom forms a part of the febrile paroxysm, it is generally so disproportionate to the cold and hot stage by which it is preceded, and exercises so great an influence on

the feelings of the patient and the course of the disease, that it merits a distinct consideration.

The fever has generally continued a considerable time, and the disease is far advanced, before the perspirations become copious. In many cases they are out of all proportion to the preceding fever,—in others, they are absent during the whole course of the disease. Louis found them wanting in one-tenth of his cases, and we have met with a few instances of the same kind. According to this observation of the physician, the stage of the disease at which the very copious perspirations occurred, corresponded generally with that at which the diarrhoea made its appearance. These two affections have commonly been considered supplementary of each other; the one diminishing as the other increased. This may occasionally be the case; but it is not the common rule, both in general proceeding apparently uninfluenced by each other. In this observation we are supported by the accurate Louis, who paid particular attention to the reputed reciprocal influence of these two symptoms, not only in phthisis, but in other diseases in which they frequently occur; and he could never find that any such reciprocal influence existed.

The perspirations occur chiefly in the mornings, more especially if the patient happens to fall asleep after having once awoken. As the disease advances, they come on whenever the patient falls into a sleep. During the early stages, they are confined to the head and upper part of the chest, but by degrees they extend over the whole surface. We have observed them exclusively confined to the anterior surface of the body, and in many cases to the head, neck, and chest. The copious perspirations of the phthisical patient present, as Louis observes, a remarkable instance of extensive and long-continued derangement of the function of the skin, without any appreciable alteration of structure; and it is very probable that if we could submit the fluid to examination, it would present characters very different from those of healthy perspiration. Although generally occurring in an advanced stage of phthisis, perspiration occasionally attends its very early periods. It seldom is copious at the commencement, and the patient, unless questioned on the subject, takes little notice of it. It not unfrequently happens that after having continued for some time, it ceases and again recurs, without our being able to account for this irregularity. In some feeble young persons, the copious morning perspiration is one of the most remarkable symptoms, and most disproportionate to all the others. We always look upon this as an unfavourable omen, and as indicating that the disease will run its course rapidly.

The importance of the perspiration as a diagnostic sign is not considerable, because other symptoms of a more marked character usually precede and accompany it; but at the same time it is never to be neglected or passed

over with indifference in doubtful cases. We have seen perspiration, a frequent pulse, and emaciation the only symptoms of tubercular disease; and whenever we meet with it in a tubercular constitution, it ought always to rouse our fears and lead us to examine the state of the chest with attention.

*Thirst.*—This is not a remarkable symptom in phthisis. It rarely exists to a very great degree, although we have seldom seen it absent. Louis found it wanting in one-fourth of his cases; and where it occurred, it appeared to be more dependent on the fever than on the condition of the digestive organs.

*Diarrhoea.*—This is so common an accompaniment of phthisis, that it has been with justice considered one of the most important of its symptoms, exerting apparently a greater influence over its progress than any other; the wasting, the debility, and therefore the rapidity of the disease being in almost all cases proportionate to the severity of the diarrhoea. In all Louis' cases, the loss of strength and wasting corresponded with the number and frequency of the evacuations. This fact suggests a wholesome and not unnecessary caution on the employment of active purgatives even in the early stages of consumption, and also of mild aperients in large doses as the disease advances; since they reduce the patient's strength, and may bring on diarrhoea before it would otherwise have occurred. We have seen a table-spoonful of castor-oil throw a phthisical patient into a frightful state of debility.

In persons who have been long constipated, and whose bowels it has been extremely difficult to regulate so as to procure healthy biliary secretions, it is often remarkable how regular the action of the bowels becomes, and how natural the evacuations are, after phthisis has made some progress.

Diarrhoea seldom occurs until the disease is far advanced; in a small proportion of cases not until a few days before death; and we have found it in a few instances entirely wanting. In one-eighth of his cases, Louis found diarrhoea commence with the disease and continue till death; in the majority it occurred in the latter stages; in others during the last days of life only; and in four among one hundred and twelve cases, it never appeared. Diarrhoea often proves one of the most distressing symptoms of the disease, being attended, after it has lasted some time, with severe pains before each evacuation, and by a deadly sensation of sinking immediately after it. The evacuations are generally of a yellow bilious colour.

Although the diarrhoea has not much influence in abating the perspirations, it occasionally has an evident effect on the cough and expectoration, diminishing the quantity of the latter and the frequency of the former. At the same time, we must observe that in one of the cases in which phthisis proved fatal without being accompanied by any expectoration, diarrhoea was also wanting. It is not, how-

ever, of much importance as a diagnostic symptom, because long before it becomes conspicuous the nature of the disease is sufficiently evident.

*Emaciation.*—Few persons die of phthisis without being reduced to a great degree of emaciation, when the progress of the disease is not interrupted by some accidental occurrence which cuts off the patient. In some cases the wasting is one of the first circumstances which attract the attention of the patient's friends; in others the disease makes considerable progress before the patient becomes visibly thinner; examples of which we have found most frequently in young females. The cases in which the emaciation takes place to a great extent before any marked symptom of pulmonary disease occurs, are met with most frequently in persons pretty far advanced in life, and in whom the disease has been induced by irregular or unhealthy modes of living, which have impaired the various functions employed in nutrition and assimilation before the occurrence of the tuberculous disease. In general, the emaciation begins early, and is probably in part owing to the disease of the lungs impeding the process of assimilation. The diarrhoea being once established, the process of wasting advances more rapidly; it goes on through the whole of the soft parts, and frequently before death little more remains than the integuments and the bony skeleton.

As a symptom of tubercular disease, emaciation merits especial attention in obscure cases. In persons about the middle period of life, from forty to fifty, we have found it one of the earliest symptoms of phthisis, even when there was no frequency of pulse, no cough, no marked dyspnoea, nor any other symptom to draw attention to the lungs. The derangement of the digestive organs which is generally present, is regarded as the principal cause of this wasting; yet, in spite of all that is done to maintain a healthy state of them and to supply abundant nourishment, the emaciation continues to make progress; and it is not till this state of things has continued for some time that the patient has evening chills, that the pulse becomes frequent, and occasional night perspirations occur.

Emaciation should never be disregarded when there is no evident cause of its presence. If it is accompanied by quick pulse and loss of strength, and especially if there is any oppression or frequency of breathing, we agree with Louis in believing that the tuberculous disease of the lungs rarely fails to prove its cause. Wherever there exist grounds of suspicion in such cases, the chest should be carefully examined.

*Edema.*—This symptom occurs in general towards the termination of phthisis only, although it occasionally appears in a slight degree at an early period. This is frequently the case in young delicate females, who are often subject to a degree of œdema in their best health, especially in warm weather.

There is nothing in the œdema of phthisis different from what is often remarked in other chronic diseases, except that it is an invariable attendant; at least we have never found it wanting in the last period of phthisis. Although usually confined to the lower extremities, and seldom extending higher than the legs, it is sometimes observed in the upper extremities; and the face is frequently œdematous in the mornings during the last weeks of the disease. (Edema of the lungs, also, occasionally supervenes in the last stages, and in other cases an œdematous state of the glottis. (Edema is of little importance as a diagnostic symptom, because for the most part the nature of the disease is well marked long before its occurrence. It is, however, in general, a sure prognostic that the disease is approaching its termination.

*Aphthæ.*—An aphthous state of the mouth is commonly the last in the long catalogue of maladies which affect the consumptive patient. It occurs generally a week or two before death, and, like the other symptoms, varies greatly in degree, being sometimes productive of little inconvenience, and at others attended with so much irritation and tenderness of the mouth, as to prove a source of considerable suffering to the patient. The approach of aphthæ is generally marked by a red shining appearance of the tongue, mouth, and fauces, though occasionally they appear with very little redness of the mucous membrane. Aphthæ are very little noticed by French authors on phthisis; Portal does not even allude to them.

*Other symptoms.*—There are some other symptoms which frequently attend the progress of phthisis, and which may be noticed in this place. An incurvated state of the nails, with a rounded appearance of the last joint of the fingers, is very often observed, and is generally regarded as a diagnostic sign of some importance. The falling-off of the hair is also a common occurrence in phthisis. The appearance of the urine deserves some notice; it is very frequently turbid, and during the fever throws down a copious sediment; while during the early stages it is often covered with an iridescent pellicle. The condition of the nervous system undergoes, with all other parts of the body, a considerable change:—the patient becomes nervous, both mentally and physically. One of the circumstances which is often remarked even in the early period of the disease is this unusual degree of nervous sensibility. The patient is timid, and apprehensive of the slightest circumstance which can increase his complaint: his hand shakes, and he often becomes peevish and irritable. These nervous affections generally keep pace with the increasing debility. The intellect, however, for the most part remains clear till within a few days of death, when slight delirium, as already mentioned, occasionally supervenes.

II. PHYSICAL SIGNS.—In the very early stage of tuberculous disease, we can scarcely expect to derive much positive information from physical signs, because the deposition



of tuberculous matter is not sufficient to produce any perceptible difference in the respiratory movements, or the sounds which accompany them. It is quite clear that, before such evidence can be presented to our senses, the tuberculous deposit must be sufficient to impede the free transmission of the air throughout the vesicular structure of the lungs, in a degree capable of modifying the sounds which accompany respiration in a healthy state of these organs. By persons possessed of a delicate sense of hearing, and whose ear has been well educated in the varying characters of the respiratory sounds, a difference may be detected, we believe, much earlier than is generally supposed; but this degree of nicety cannot be expected from the ordinary auscultator. Those persons, however, who have endeavoured to ridicule the stethoscope because it could not detect tuberculous disease at such an early period as we are now contemplating, could neither have possessed a right conception of the principles upon which the physical signs of pulmonary disease depend, nor a correct knowledge of the anatomy of incipient tubercles. They might as justly deny the powers and utility of the telescope because it does not enable us to ascertain all the minute phenomena of the starry heavens. Those, also, who venture to affirm that auscultation is useless until the disease is rendered evident by the common symptoms, are equally in error. It is true that auscultation *alone* is not sufficient to ascertain the existence of the disease at a very early period; yet, even at this time, the information which it affords is often very valuable both in a negative and positive point of view. If it does not give us positive assurance of disease when it is limited, it will generally enable us to say when disease does not exist to a great extent. In doubtful cases, therefore, we should never fail to examine the sounds of respiration and the degree of resonance of the upper parts of the chest. If both are natural and alike on both sides, we may feel tolerably certain that tuberculous disease does not exist, or is very limited; if, on the contrary, they differ, we shall ascertain the presence of disease which the ordinary symptoms scarcely led us to expect: in a few cases we have even found pectoriloquy, when neither the appearance of the patient nor the symptoms induced us to anticipate it. We therefore hold it wise to avail ourselves of auscultation in all cases. It will often assist us powerfully in our diagnosis, and can never lead into error when its results are taken in conjunction with our other means of diagnosis.

The following method of proceeding, while it will be the least formidable to the patient, will enable us most readily to discover the presence and site of disease.

*Respiratory movements.*—In examining the chest, it is of importance to do so with as little parade as may be; otherwise, if the patient is nervous, the respiratory movements may be so imperfectly performed that we shall be

unable to obtain any satisfactory information from them. It will also be advantageous to adopt a certain order in our examinations. We should first observe carefully the state of ordinary respiration, and afterwards, by placing the patient fairly before us, mark accurately if both sides of the chest are equally raised during a full inspiration. A difference in this respect between the two sides will frequently lead us to the seat of the most extensive disease, which exists for the most part on that side which is least raised.

*Percussion.*—This may next be resorted to, below the clavicles and over the inner extremity of these bones, in order to compare the sound of the chest with that of a healthy one (with which we suppose the auscultator to be acquainted), and also the sound of one side with the other. Mediate percussion is preferable in most cases; it is far more agreeable to the patient, and if carefully performed affords equal information. Various substances have been used as pleximeters; that which we think most suited for the purpose is a piece of flat caoutchouc; but perhaps the best, and almost the only one we employ, is the finger; it conveys the sound with perfect clearness, while at the same time it removes any fear of uneasiness on the part of the patient. To perform percussion well, either the back or fore-part of the finger may be pressed firmly on the chest; it should then be struck smartly but lightly with the points of two or three fingers of the other hand; to effect this, very little force is required; in children or young spare persons, the point of a single finger is sufficient. This simple operation will, with few exceptions, afford us all the information to be derived from percussion. It is not, however, by any means so easy as is commonly believed, and consequently it is often imperfectly performed. The points particularly requiring attention are, to keep the finger in close contact with the chest, to strike it at the same angle wherever applied, and to do this so as to elicit the resonance of the contents, not merely of the parietes, of the chest.

*Auscultation.*—Having ascertained the resonance of the chest, we next proceed to examine the respiratory murmur, either with the unaided ear, or through the medium of the stethoscope. Although the ear alone is sufficient to examine most parts of the chest, there are some situations in which the stethoscope is preferable; such as immediately below and above the clavicles in some persons, and in the axillæ of all. There are other objections to the application of the ear—some referrible to the patient, others to the auscultator, which are sufficiently obvious. On the back and sides, however, when the form of the chest admits of it, the ear is generally preferable; but, assuredly, he who can use the ear and the stethoscope with equal facility and effect, possesses advantages which are not enjoyed by the auscultator who can use one of them only; and when we hear it stated that the ear answers all the purposes of a stethoscope, we are disposed to conclude

that the advocates of that opinion are not very minute in their investigations.

*Value of the physical signs.*—1. Tuberculous disease must occupy a considerable portion of the lungs before we can conceive it capable of influencing the motions of the chest to a perceptible degree; simple inspection is not, therefore, of great value in the very early stage of the disease, but it is often useful, and not unfrequently points out the chief seat of the disease when it is more extensive. Neither is percussion of much value in detecting the very early stages of tuberculous disease, as this may exist even to a considerable extent, if the surrounding pulmonary tissue is healthy, without being detected by percussion; the sound elicited may even be clearer than over a more healthy portion of the lung. This will be the case when the pulmonary vesicles are dilated, which they often are, amid groups of small tubercles. Hence, by trusting to percussion alone, we might be led to consider the diseased as the sounder side of the lung; and we are the more likely to fall into this error, the greater the extent of the emphysematous portion of the lung. In such cases, by percussing carefully, we shall sometimes find a small spot, the dull sound of which contrasts remarkably with that of the surrounding emphysematous parts. In judging of the sonority of the chest, the thinness of the parietes must be taken into account; otherwise it may lead to error in the case of children and very thin persons.

When the disease is farther advanced, and the tubercles have coalesced so as to form a solid mass, or when the pulmonary tissue immediately surrounding them is rendered impermeable to the air by the effects of inflammation, a dull sound is perceptible over such portions of the lung; and if this dull sound exists in the upper part of the chest only, it may be considered as very generally indicating the presence of tubercles.

2. The information which auscultation affords us is more valuable and precise than that derived from the movements or resonance of the thorax; but in order to obtain the full advantage of it, we must employ it with circumspection, as various circumstances may render it deceptive. A morbid condition of the mucous membrane from frequent attacks of catarrh, or what has been termed by Laennec "the dry catarrh," or an emphysematous state of the lung, may render the respiratory murmur obscure, and lead to the belief that the lung is consolidated. Percussion, however, will enable us to correct both errors: in the first case it elicits the natural sound, in the latter a particularly clear, or even tympanitic sound. Emphysema is a more frequent source of error than is usually imagined. Portions of the lung are very frequently emphysematous, both in phthisical and other patients, particularly in persons subject to chronic coughs, or whose breathing is habitually laborious; and without keeping this in view, we may err in our diagnosis. In these cases, along with the obscure or absent respiratory murmur, we have

the clear sound on percussion, and often a more elevated state of the chest over the emphysematous portion of lung; and if the emphysema exists more on one side than on the other, this rounder form of the chest is more remarkable, particularly in phthisical subjects, in whom the chest usually falls in under the clavicles. A little attention to these circumstances will soon enable the young auscultator to discriminate them.

When the presence of tubercles is suspected, we examine with the greatest care the clavicular and supra-scapular regions. If the respiration be soft, and free from any rhonchus in this region, if it be the same on both sides, and if the resonance of the voice be also equal, we have strong evidence that there is no tuberculous disease in that part of the lungs where it is most frequently found, or, if it does exist, that it is to a very small extent only.

If the tubercles are scattered generally through the summit of one lung, the resonance of the voice becomes rather stronger, and the respiratory murmur is simply rendered somewhat bronchial and less soft. If, on the other hand, they are in considerable numbers and confined to a portion of the upper lobe, the natural respiratory murmur is in a great degree lost, the respiration being almost entirely bronchial. In such cases the resonance of the voice also is much louder over the diseased than over the sound portion of lung, and amounts often to what is termed bronchophony. As tubercles are almost constantly present to a greater extent on one side of the chest, this difference of the signs on the two sides will greatly assist us in our diagnosis in obscure cases.

Although we have pointed out the upper part of the chest as that which requires to be most minutely examined in all cases where we suspect the presence of tuberculous disease, the examination should be extended over the whole chest; as the symptoms may be produced by chronic pleurisy or chronic pneumonia, the signs of which must be looked for in the condition of the lower part of the lungs. The upper lobes also are not always the seat of tubercles, although they are most frequently so; hence we should not draw our conclusions until we have ascertained the state of the respiration over the whole chest. In doing this we should not expose the chest; it may be covered with a flannel dress, which it will only be necessary in some cases to remove from the clavicular regions, where the examination should always be made with the greatest care.

By adopting this plan of careful investigation on being first consulted, we do not hesitate to express our conviction that the greater number of cases of tuberculous phthisis would be discovered at a much earlier period of their course,—often, we are satisfied, many months, nay even occasionally years before they now are, from the careless manner in which this class of patients are too commonly examined. Until we adopt a more minute and methodical system of inquiry into the

history of the case, and, in addition to the usual symptoms of pulmonary disease, avail ourselves of the light afforded by auscultation in the most extended sense of that term, tubercular disease of the lungs can rarely be detected at such an early period of its progress as will give reason to hope that its further advancement may be prevented. In the present superficial mode of conducting our inquiry into the nature of such cases, the disease of the lungs has too often made considerable progress when the patient is said to be merely threatened with it; and tracheal or bronchial irritation are the terms employed to account for symptoms which a close investigation would trace to a deeper source. We must not be satisfied with a few rough and slovenly thumps on the upper part of the chest, or even with the use of the ear or stethoscope for a few seconds, applied as if we were afraid rather than desirous of ascertaining the real condition of the lungs. Such superficial examinations, if they deserve the name, are worse than useless: with the semblance of doing something, they really effect nothing, unless it be to deceive the patient and his friends, and bring this method of diagnosis into unmerited disrepute. Nature will not be interrogated in this rude manner; her operations must be observed with care and studied with attention, before we can hope to interpret them with fidelity and precision.\*

#### SECT. V. OF THE MORBID ANATOMY OF PHTHISIS.

The morbid anatomy of phthisis was for ages misunderstood; the real nature of tubercle being unknown, and the ulceration which follows the evacuation of the tuberculous matter being considered the cause of the disease. Tubercles are, however, mentioned by Hippocrates, who noticed them in the lungs and on the pleura, and thought that they consisted of a putrified phlegm. His opinions, with some obscure notions of Galen respecting ulceration of the lungs being caused by the descent of humours from the head and the putrefying of blood effused in the lungs, were adopted by most medical writers who mention tubercles, until after the revival of letters. Sylvius de la Boe, whose works were published in 1679, was the first who gave a good account of tubercles, pointing them out as a cause of phthisis, and showing their connexion with scrofula. He thought they arose from the scrofulous degeneration of certain invisible glands in the lungs, similar to those in the neck and mesentery.† His opinions were adopted and illustrated by several of his successors, particularly by Morton and Wepfer, and have been revived in our own day by Broussais. Nothing more was known concerning them till the comprehensive and satisfactory essay of Desault of Bordeaux was published in 1733.‡ This

author having applied himself during a period of thirty-six years to the investigation of phthisis, acquired an extensive knowledge of the morbid anatomy of the disease. He maintained that the formation of tubercles in the lungs was the sole cause of phthisis, and pointed out many of the facts regarding their development which have since been attributed to more recent authors. In the middle of the last century, Russel, Tralles, Gilchrist, and Mudge, adopted, more or less, the views of Desault, while their contemporaries neglected or forgot his discoveries. With these exceptions, the knowledge of tubercles seems to have rather retrograded than advanced, till it was revived by the indefatigable researches of our countryman Stark; in whose early death the literature of medicine sustained a serious loss. Had his life been spared, he would, in all likelihood, have anticipated our continental neighbours even in their minute pathology; while his care and skill in the application of his facts to practice would have prevented the science from becoming, as it has in the hands of some, a hindrance rather than a help to the therapeutic art. By his own careful and minute observations, he acquired a surprising knowledge of the morbid anatomy of tuberculous phthisis.

The following enumeration of the facts which he ascertained by the examination of ten bodies only, will show at once the attention with which he had marked every circumstance, and the extent of our loss by the premature termination of his labours. He found that tubercles are not vascular, and exhibit no trace of organisation when examined by the microscope; that they are of every size, from that of a granule to the diameter of half an inch; that they soften at various points of their substance; and that the cavities left by them vary in size from half an inch to three or four inches. He also found that these cavities communicate with the bronchi by smooth round openings, and with each other by ragged ones; that they are always lined, entirely or partially, with a smooth, thin, tender slough or membrane; that the larger cavities are often found nearly empty; that they are generally situated towards the back part of the upper lobe; that their communication with the cavity of the chest is prevented by broad firm adhesions between the pleura costalis and that portion of the lungs which they occupy; and that even crude tubercles are seldom found unaccompanied by such adhesions. He also described most accurately the hepatization of the lung, and the obliteration of the bloodvessels in the neighbourhood of tubercles and caverns. Nor did the thickening and reddening of the bronchi and trachea, nor the ulcerations of the intestines escape his observation.\*

Since Stark's time the works of Baillie, and still more those of Bayle, Laennec, Louis,

\* For a more detailed exposition of Auscultation, see the able article on that subject.

† *Opera Medica*, p. 692.

‡ *Dissertation de Médecine*, tom. i.

\* *Stark, Clinical and Anatomical Observations and Experiments.*

Andral, and Carswell have rendered our knowledge of the morbid anatomy of tubercles more complete than that of any other morbid product. Various opinions, however, are still entertained respecting their nature and mode of development; but as these have been fully discussed in the preceding article TUBERCLE, we will at present confine our observations to the formation and progress of tuberculous matter in the lungs, and to the changes which its presence induces in this organ.

Tuberculous matter is deposited in three distinct forms,—namely, grey semi-transparent granulations; caseous, or crude tubercle; and tuberculous infiltration.

**Granulations.**—Grey semitransparent granulations are scarcely ever absent in any stage of phthisis, and accompany every form of the disease. They have a consistence somewhat less than cartilage, being sometimes almost colourless, though generally grey; they vary in size from that of a mustard-seed to a pea, being sometimes distinct, sometimes united in small clusters like grapes, and more rarely agglomerated in masses of one, two, or three cubic inches. They are most commonly found in considerable numbers, often occupying a great part of the tissue around large excavations and of the bands which traverse them. The period required for their development is very variable. In acute phthisis, Louis says they may reach the size of a pea in three or four weeks; in other cases they may remain small for a considerable period; thus, in several individuals who had cough and frequent attacks of hemoptysis for many years, granulations, about the size of peas, were the only lesion found by this physician after death. When subjects already labouring under phthisis or who have a highly tuberculous disposition are exposed to violent irritations of the lungs, these granulations are deposited so rapidly and in such numbers over the whole extent of the lungs, as to give rise to the most alarming dyspnoea, and even cause death by suffocation. A case of this kind is related by Bayle, which terminated fatally in twenty-two days.\*

The granulations, after a time, begin to lose their transparency and consistence, and become white, opaque, and friable. When these changes are completed, the granulations receive the name of crude tubercles. The period at which such changes take place varies indefinitely; in adults, death rarely happens before some of them are effected; yet Louis has met with five adults in whom the granulations were unaltered. From the observations of Papavoine,† Tornelle,‡ &c. it would appear that the change takes place much more rapidly in children than in adults. Laennec and Louis suppose that it begins invariably at the centre of the granulations; but Andral and Carswell§ maintain that it may

begin at the centre or at any point of the circumference indifferently.

Grey granulations were first observed and described by Bayle, who thought they were a morbid product, *sui generis*. He described them as constituting a species of phthisis, sometimes entirely simple, but most commonly complicated with the tuberculous. He supposed that in time they produce ulceration, and that the caverns to which they give rise are distinguished from those which follow tubercles by being lined with false membrane. Laennec, on the other hand, maintained that they are necessarily the first form under which tubercle presents itself; and Louis and some other pathologists have adopted Laennec's views. Another opinion regarding the nature of these granulations has been advanced by Andral,\* who has endeavoured to prove that they are the result of chronic inflammation of the parietes of the air-cells. The opinion that grey granulations always constitute the first stage of tubercles is supported by the following facts—that granulations are found only in tuberculous subjects; that, in them, they occur, not only in the lungs but also in the lymphatic glands, in the liver, in the spleen, and on serous membranes; lastly, that in these organs, as in the lungs, they ultimately assume the character of crude tubercles. But Dr. Carswell shows that the grey semitransparent substance does not necessarily precede the formation of opaque tuberculous matter; that the latter is found in several organs in which granulations are never observed; and that its form chiefly depends on the structure of the organ in which it is deposited.

**Crude tubercle.**—This term is applied to certain tumours of a rounded form, varying in size from that of a pin's head to a small walnut. They have a yellowish white colour and a soft cheesy consistence: in some cases only a few are detected at the summit of the lungs; in others they occupy the greater part of their substance. They are, as we have before seen, generally the result of changes which have taken place in the matter deposited under the form of grey granulations; although, on the other hand, it is the opinion of all modern pathologists, with the exception of Laennec and Louis, that tuberculous matter is often primitively deposited in the crude form, in the lungs as well as in other organs. This opinion is supported by the facts that the granulations in some instances are wholly wanting,—and that large masses of crude tubercle are found in some cases of acute phthisis which are too rapid in their march to allow time for the change from granulation to tubercle. These two forms, however, almost always co-exist; Louis having met with only two cases of crude tubercle without granulations, and five of granulations without tubercles.

3. **Tubercular infiltration.**—The third form in which tuberculous matter presents itself in the lungs is that of infiltration into the

\* *Recherches sur la Phthisie Pulmonaire*, p. 127.

† *Journ. des Progrès*.

‡ *Journ. Hebdomadaire*.

§ *Illustrations of the Elementary Forms of Disease. Art. Tubercle*.

\* *Clinique Médicale*, tome ii. p. 9, seconde edit.

cellular tissue of the organ. Baillic, who first noticed this state, gives the following accurate account of it:—"In cutting into the lungs, a considerable portion of their structure sometimes appears to be changed into a whitish soft matter, somewhat intermediate between a solid and a fluid, like a scrofulous gland just beginning to suppurate. This appearance is, I believe, produced by scrofulous matter being deposited in the cellular substance of a certain portion of the lungs, and advancing towards suppuration. It seems to be the same matter with that of tubercle, but only diffused uniformly over a considerable portion of the lungs, while the tubercle is circumscribed."\* This has since been described by the French under the name of "infiltration."

Another deposit of a peculiar kind never found in other diseases, is the yellow jelly-like matter, the "infiltration tuberculeuse gelatiniforme" of Laennec, who believes that it is only a more liquid state of the tuberculous matter poured into the parenchyma of the lungs. From our knowledge of the various forms which tuberculous matter assumes in other parts, and from having seen large quantities of a similar matter containing small isolated flakes of crude tubercles deposited around a scrofulous joint, we are inclined to adopt Laennec's opinion.

In general tuberculous matter first makes its appearance in the lungs in the form of the grey semitransparent granulations which we have just described, and which gradually take on the characters of crude tubercles. While these undergo the usual process of softening, and while ulceration is going on around them, tuberculous matter continues to be deposited in the neighbouring tissue, so that we often find excavations at the summit, crude or softened tubercles below these excavations, and granulations offering no trace of opaque matter in the lowest part of the lungs. At a late period of the disease the pulmonary parenchyma is occasionally so filled with tuberculous matter as to leave but few traces of its original structure, the whole constituting one dull, opaque, grey, or white mass of tubercular infiltration, excavated to a greater or less extent.

The nature, extent, and relation of the different forms of tuberculous matter, and the changes which they undergo in the lungs, vary greatly in different cases. The upper and back part of the lungs is the most common seat of tubercle, and the left side is more frequently affected than the right; an observation which was first made by Stark, and corroborated by Carmichael Smyth from an examination of the cases recorded by Bonet and Morgagni, and more recently by Louis from his own experience. The last author found tubercles exclusively confined to the right in two cases only, whereas he noticed the same occurrence in five instances on the left side: of thirty-eight cases

in which the upper lobe was totally occupied by large excavations and tubercles, so as to be impermeable to the air, he met with twenty-eight in the left and ten only in the right lung: and in eight cases of perforation of the pleura, he found seven on the left and one only on the right side. When to these observations we add the result of Reynaud's experience, who found twenty-seven of forty cases of pneumothorax on the left side, and thirteen only on the right, we consider that we have sufficient evidence to confirm the conclusion that the left lung is most frequently affected.\* This, however, is the reverse of the relative frequency of pneumonia, at all ages, on the two sides. M. Lombard found that of eight hundred and sixty-eight cases of pneumonia, four hundred and thirteen were affected on the right side only, two hundred and sixty on the left, and one hundred and ninety-five on both sides. By the above comparison it appears that pneumonia on the right side is to that on the left, in point of frequency, as three to two.†

*State of the lung around tubercles.*—So long as the tuberculous matter remains as primarily deposited, whether in the form of grey granulations or crude tubercle, we find the surrounding parenchyma healthy; but as soon as the change of grey granulations to crude tubercles or softening in the latter begins, we find the pulmonary tissue around the tubercles in a state of congestion, firmer than natural, and of a red or grey colour. In some cases the tubercles do not excite irritation in the surrounding tissues, and consequently remain, even for years, in their original state; in others the more fluid parts of the tubercle are simply absorbed, while the more solid ones are left in the form of a calcareous concretion. This last termination is more common than is usually imagined, and is met with very frequently in persons who fall victims to a subsequent attack of phthisis at a more advanced period of life. In such cases the new deposit occurs most readily in those parts of the lungs previously affected, and whose tissue has been more or less changed by the presence of the tubercles originally formed; for it is by no means uncommon to find bony or calcareous concretions in the midst of tuberculous masses, in caverns, or even expectorated with matter derived from the softening of tubercles of a more recent date. In the process of this change from crude tubercle to calcareous concretion, such a degree of irritation occasionally takes place in the immediately surrounding parenchyma, as to produce the deposition of coagulable lymph, which then forms a sort of cyst surrounding the tubercle or concretion, and thus completely destroys its power of again irritating the lung.

The process of softening has been regarded as a consequence of the death of the tubercle, by those who, like Laennec, regarded this sub-

\* Morbid Anatomy.

\* Journ. Hebdomadaire, vol. vii. p. 61.

† Archives Gén. de Méd. t. xxv. p. 60.

stance as an organisable morbid product; and it has been stated by others who did not take this view of the subject, to begin always at the centre and to proceed towards the circumference. This opinion, however, supposes some change in the substance of the tubercle; but as we have ample proof that tubercle is a mere morbid product or secretion incapable of organisation, we cannot admit that it is subject to any change after its deposition, excepting that which arises from the action of the surrounding tissues upon it. Dr. Carswell has shown that the softer appearance of the centre of the tubercle has no connection with the process of softening, but depends on the tuberculous matter being deposited from the internal surface of the air-vesicles or bronchi, leaving a hollow in the centre filled frequently with the soft fluid usually contained in them. This central softening has been attributed by Andral to the escape of a portion of the tubercle along the bronchi. Stark, Andral, and many others have made the observation that the softening does not always begin in the centre, but may appear either there or at some part of the circumference indifferently. The process of softening is, in our opinion, to be regarded merely as a consequence of the changes produced in the tissues where this matter is deposited. Before these changes take place, tubercle appears to excite little disturbance of the general economy, and may exist for a length of time in several organs, attended by symptoms so slight as scarcely to indicate its presence.

The changes in the lungs induced by the existence of tubercles, are, sanguineous congestion, inflammation, induration and softening, ulceration, mortification, and atrophy. When the tubercles exist in great numbers, or accumulate in considerable masses before the process of softening commences, they press upon and generally obliterate some of the blood-vessels; thus preventing the free circulation of the blood, and giving rise to various degrees of congestion. When this occurs towards the root of the lungs, the obstruction to the return of the blood which it occasions, is so great that the small capillaries often give way, and the blood is poured into the bronchi. Hemoptysis arising from this cause was first noticed by Desault, and has been much insisted on by late authors.

When, instead of producing merely impeded circulation and consequent congestion of the lungs, tubercles give rise to irritation and inflammation in the surrounding tissues, or when other causes excite inflammatory action in parts containing tubercles, we have the usual appearances of inflammation in its various grades. The parts in immediate contact with the tubercle pour out serosity and take on the ulcerative action, by which the tuberculous matter is broken up and sooner or later expectorated, leaving a cavity in its place. By this successive breaking down of the contiguous tuberculous masses, the cavity becomes increased in size, when it is usually termed a "cavern."

The views of Dr. Carswell regarding the seat of tubercle enable us to explain, in a very satisfactory manner, the mode in which the different tissues are successively affected. The tuberculous matter being, as he describes, deposited in the air-vesicles and minute bronchial tubes, these parts are necessarily first irritated by it; and being constantly distended and pressed upon in every direction by the matter accumulating within them, are gradually enlarged in size, and sooner or later destroyed by the ulcerative action. The bronchi are thus found invariably enlarged, stopping abruptly, and appearing as it were cut across at their entrance into a cavern; and unlike the other tissues of the lungs, they are never found enveloped and compressed by deposition of tuberculous matter around them, except in those instances of rapid infiltration in which the whole substance of the lung appears injected simultaneously.

The surrounding cellular tissue, healthy air-vesicles, and bloodvessels, are at first only pushed aside by the deposit of the tubercle, and are therefore only affected in a secondary manner, which is nevertheless sufficient to cause their atrophy, or produce from the infiltration of fluids a condensed state, partaking more or less of the characters of tuberculous matter, or of the common products of inflammation. Hence, the tissue which surrounds crude tubercles and excavations is almost always impervious to air, from the effects of inflammation or the infiltration of tuberculous matter.

The mode in which the bloodvessels are affected by the development of tubercles and the formation of caverns in the lungs, has been so well described by Stark, that we cannot refrain from introducing the whole of his remarks upon it. "The pulmonary arteries and veins," he says, "as they approach the larger vomicæ are suddenly contracted; a bloodvessel which, at its beginning, measured half an inch in circumference, sometimes (although it had sent off no considerable branch) could not be cut up further than half an inch. And when outwardly they are of a large size, yet internally they have a very small canal, being almost filled up by a fibrous substance; and frequently as they pass along the sides of vomicæ they are found quite detached, for about an inch of their course, from the neighbouring parts. That the bloodvessels are thus obstructed, and that they have little or no communication with the vomicæ, is rendered still more evident by blowing into them; by blowing they are not sensibly distended, nor does the air pass into the vomicæ, excepting very rarely, and then only by some imperceptible holes: and after injecting the lungs by the pulmonary artery and vein, the parts less affected by disease, which before injection were the softest, become the hardest; and vice versa, the most diseased parts, before injection the hardest, are now the softest.

"Upon cutting into the sounder parts, numberless ramuli may be seen filled with the wax,

but in the diseased parts there is no such appearance; and upon tracing, by dissection, the injected vessels, those which terminate in the sounder parts may be traced a long way to the smaller ramuli; but those which lead to tubercles and vomicae a very short way, and only to their principal branches. The wax was very rarely found to have entered the middle-sized vomicae, and never the smaller or larger ones."\*

Perforation of the coats of the bloodvessels, though never observed by Stark, occasionally takes place; and according to the size of the opening and the capacity of the affected vessel, the patient may have trifling hemoptysis, or perish in a few seconds from the profuse discharge of blood. The rarity, however, of this accident may be estimated by the fact, that the bands which traverse the caverns were found by Louis to contain pervious bloodvessels in only five out of one hundred and twenty-three subjects whom he examined.

As the neighbouring caverns increase in size, the intervening parenchyma is gradually destroyed, till they coalesce, and change an entire lobe into one large, jagged, irregular cavity, in which portions of pulmonary tissue are often found, either hanging loosely or traversing it in various directions in the shape of bands, and occasionally perfectly detached. These loosened portions, the bands, and the walls of the caverns, present little or no trace of the healthy pulmonary structure. They are of a red or grey colour and exceedingly hard, being for the most part composed of semi-transparent granulations, or crude tubercle and black pulmonary matter. Portions of the walls also occasionally mortify, which gives rise to the fetid smell which is sometimes observed in the breath and expectoration of the patient towards the termination of the disease.

After the matter first formed is expectorated, a fluid more or less resembling pus continues to be secreted from the parietes of the caverns. These are composed of the pulmonary tissue, generally covered with a crust of very soft, grey, inorganic matter, from one to two lines in thickness. This is believed by most pathologists to consist merely of the thicker parts of the matter secreted by the surrounding pulmonary tissue. It is intimately united with the mucous membrane of the bronchi at the point where the latter enter, and according to Louis frequently consists of two layers,—the first or internal being dense, grey, almost semi-transparent and semi-cartilaginous, about the third or fourth of a line in thickness; the second being very soft, yellow or white, of about the same thickness, but often not continued over the whole surface, as the first is. Both these layers were wanting in a fourth of the cases examined by Louis, leaving the pulmonary tissue quite bare. Their density and even their existence often seem to bear a relation to the age of the cavity.

The cavities generally contain more or less

of a fluid of various consistence and colour; sometimes having a resemblance to thick curds; at others to pus, mucus, or simple serum. A cavity may contain more or less of all these various products mixed with effused blood or destroyed parenchyma, or it may be filled with one only. In a few rare cases, it is found quite empty, and is then generally lined throughout with a dense false membrane. Cavities were never found empty by Louis, before the end of the third or beginning of the fourth month from the commencement of the disease. When old, and especially when not lined with membrane, they contained a green, dirty-looking fluid, sometimes tinged with blood.

Although, as we have seen, caverns generally tend to increase in size, yet not infrequently when they occur singly, and when no fresh depositions of tubercles take place, they remain a long while stationary. In cases still more uncommon, they gradually contract and are obliterated. The process by which this obliteration is effected is well described in Dr. Carswell's Illustrations already referred to. The parietes of the cavity consisting of simple mucous tissue become gradually and successively converted, according to this author, into serous and fibrous, and sometimes into fibro-cartilaginous and cartilaginous tissue. More frequently it retains the fibrous character, possessing the property of contracting, so as to diminish the bulk of the excavation. As the contraction proceeds, a puckering of the surrounding lung takes place, which is most conspicuous where the pleura is forced inwards by the retrocession of the pulmonary substance. The contraction in some cases proceeds so far that a small portion of fibro-cartilaginous tissue only remains where an excavation of considerable extent had existed.\* That caverns are really obliterated in this manner is proved by the previous existence of pectoriloquy and other signs of caverns in those parts where the cartilaginous masses are found; by their situation and form; by the condition of the bronchi, and the puckering of the surrounding pulmonary tissue. This alone constitutes what can be considered a perfect cure of tuberculous disease of the lungs.

Caverns vary extremely in size, being sometimes so large as to occupy the whole of the superior lobe; being bounded superiorly by a semi-cartilaginous false membrane, and inferiorly by the pleura separating the superior from the inferior lobe: in other cases the cavern of the superior lobe communicates with one in the posterior part of the inferior. Caverns are usually nearer to the posterior than to the anterior surface of the lung. Louis never found them large in the middle of the inferior lobe; but in the greater number of subjects, he met with them in both lungs; in the sixth part of the cases they were found in one lung only.

The extent to which the lungs are affected

\* Op. cit.

\* Op. cit.

by the progress of tubercular disease varies indefinitely. In some cases a few caverns only are found at the summit of the lungs; in others the quantity of healthy parenchyma which remains is so exceedingly small as to excite surprise that the function of respiration could have been carried on so as to support life. Stark calculated that the portion which remains fit for the admission of air may be estimated, at a medium, to be about one-fourth of the whole substance.

SECT. VI.—OF THE PRINCIPAL COMPLICATIONS OF PHTHISIS.

Since tuberculous phthisis has its origin in a morbid state of the constitution, we should naturally expect to find the disease affecting various organs. This is actually the case; for although the lungs are generally the organs first and most extensively affected, many other parts become tuberculous in the course of the disease: indeed there is scarcely an organ or structure of the body in which tubercles do not occasionally occur in the progress of consumption.

There are also other morbid states, particularly of the mucous membranes, which complicate phthisis, and are so intimately connected with it as apparently to form a constituent part of the disease. We shall confine our remarks in the present chapter to the most frequent and important of these complications. It is, however, worthy of notice that some of these secondary affections are occasionally so prominent as to be taken for the principal disease; and it is not till after death that the primary and most important affection is made manifest. In some cases, for example, the diarrhoea is so severe, and assumes so much the character of chronic dysentery, as to throw in the back ground, for a time, the less evident symptoms of pulmonary phthisis. But, on examination after death, although the intestines are found ulcerated in such cases, the lungs are in general so much more extensively diseased, as to leave no doubt that they were the primary seat of the morbid affection. Again, disease of the larynx occasionally produces such marked symptoms that it is taken for the chief disease, even when the lungs are extensively tuberculous. We shall briefly advert to the chief of these complicating affections.

I. DISEASES OF THE ORGANS OF RESPIRATION.—The mucous membrane of the air-passages is generally diseased to a greater or less extent, in the course of pulmonary consumption.

*Ulceration of the epiglottis.*—This generally occurs late in the disease. The ulceration, when slight, gives rise to no symptom by which its existence can be known; but in general the larynx is affected at the same time and in the same manner. The lingual surface of the epiglottis is rarely ulcerated; Louis found it in one case only. The symptoms of this affection are, a painful sensation in the region of the os hyoides and difficult deglutition, fluids being frequently ejected through the nostrils in the attempt to swallow them. This

last symptom is characteristic of diseased epiglottis, although it does not always attend it: we have seen the epiglottis swollen and intensely red, although deglutition was not attended with much pain. In some cases the epiglottis becomes oedematous.

*Ulceration of the larynx.*—This also is a frequent concomitant of tuberculous disease of the lungs. It occurs for the most part only in the advanced stages, but occasionally symptoms indicative of its existence make their appearance before the signs of the pulmonary affection are very evident. The symptoms by which it is accompanied depend upon the site of the ulceration, and of course keep pace with its extension. In some cases they are so prominent and attract so forcibly the attention of both the practitioner and patient, as to lead to the belief that the larynx is the chief seat of the disease, and that the patient labours under laryngeal phthisis. But, as M. Andral justly remarks, the disease which has been designated by that term is in most cases nothing more than pulmonary consumption accompanied by a morbid condition of the larynx, the symptoms of which predominate and mask those of the pulmonary disease upon which the emaciation, hectic fever, night-sweats, and other symptoms of phthisis chiefly depend. One of the most constant symptoms of ulcerated larynx is hoarseness, which goes on often to complete aphonia. More or less pain commonly exists in the region of the os hyoides, being often severe when the ulcerations are deep. The cough has a peculiar character in this affection; it is accompanied with a harsh, grating sound, and sometimes resembles a kind of whistling.

*Ulcerations of the trachea.*—These do not give rise to any particular symptoms, and their existence is in general ascertained only by examination after death. One patient only of the many examined by Louis complained of the sensation of heat and obstruction behind and above the sternum; in this case a great part of the mucous membrane of the fleshy part of the trachea was destroyed by ulceration. In the other cases examined by this accurate pathologist, no symptom could be attributed to the ulcerations however numerous; neither the cough nor the character of the expectoration had anything peculiar. Louis attributes the absence of symptoms in these cases to the slowness with which the disease proceeds. When simple inflammation of the mucous membrane of the trachea exists, there is often a sensation of heat and pain. Ulcerations of the trachea are almost exclusively found in phthisical subjects: they are frequently confined to one side of the trachea, which, according to Andral's observations, invariably corresponds with the diseased lung, or, if both lungs are diseased, with that which is most affected.\*

The bronchial membrane is found reddened, much thickened, and sometimes ulcerated. These changes are, however, chiefly confined

\* Op. cit. vol. ii. p. 475.



to the tubes in communication with caverns, and in M. Louis' opinion, depend upon the passage of the purulent matter along them, inasmuch as they are seldom met with in the neighbourhood of unsoftened tubercles or grey granulations, and occur more frequently and to a greater extent near old caverns than near those of recent formation. The like changes which occur in the larynx, trachea, and epiglottis, appear to M. Louis to be connected with the passage of the sputa; since they affect chiefly the posterior parts of the trachea and larynx, and the laryngeal surface of the epiglottis, and are, as we have before remarked, scarcely ever found on the lingual surfaces of the latter, or in the ventricles of the larynx. At the same time, the circumstance that disease of the larynx occasionally precedes the stage of expectoration may be adduced as an objection to this opinion; and although Louis never found grey granulations or tubercles in the tissue or at the surface of the larynx or trachea, Dr. Carswell has occasionally met with tuberculous matter in the mucous follicles of the larynx.

Ulcerations are much more frequent in the larynx and trachea than in the larger bronchi. In the minute ramifications of the bronchi Dr. Carswell informs us ulcerations are very common. The ulcers are generally accompanied with reddening and thickening of the surrounding membrane, although Louis has met with instances in which this was perfectly colourless. The margins of the ulcers are even and well-defined, and are generally so small and superficial as to be detected only by close examination. At other times they extend along the whole length of the fleshy portion of the trachea, or along the back of the larynx or under-surface of the epiglottis. They seldom penetrate deeper than the mucous membrane, although cases occur in which the muscular and cartilaginous rings of the trachea, the vocal chords, the arytenoid cartilages, and epiglottis are partially involved in the disease; and in one case observed by Louis the latter was completely destroyed.

The close connexion of these lesions with phthisis is established by the fact that Louis found ulceration of the epiglottis and larynx in *one-fifth*, and ulceration of the trachea in *one-third* of the cases of phthisis which he examined; whereas he found it once only in one hundred and twenty-two patients who died of other chronic disorders. The same accurate pathologist discovered that these ulcerations occur more frequently in men than in women, in the proportion of two to one.

*Affections of the pleura.*—The morbid changes which the pleura undergoes during the progress of tuberculous disease of the lungs consist in the effusion on its surface of coagulable lymph, and consequent adhesion to the pleura costalis. Such adhesions almost constantly accompany the formation of tubercles, and in extent correspond to that of the tubercular disease. In one hundred and thirteen cases which were examined by Louis, both lungs were free from adhesions in one

instance only; the right was exempt from them in eight cases, and the left in seven. In twenty-eight examples, the adhesions were small and easily broken down, and the caverns in these cases were either small or wanting. In the other two-thirds, the adhesions were dense and firm, and accompanied with excavations of large size. In two cases, where the lungs contained only two excavations, the adhesions existed only in the parts corresponding to them.

These facts show, in the clearest and most satisfactory manner, the intimate relation of tubercles and adhesions as cause and effect. From the adhesions being often confined to the spot corresponding to the tuberculous excavations, and from the absence of all appreciable signs of inflammation during their formation, it is probable that the lymph of which they are composed is frequently poured out from the vessels with little or no irritative action. If the ulcerative process goes on in the walls of the caverns till the intervening pulmonary tissue and pleura are destroyed, these adhesions form the proper walls of the caverns; and if the process advances, they also may be destroyed, and the matter point externally. These adhesions sometimes present the appearance of semi-cartilaginous crusts, covering the summit of the lungs, and are in other instances changed into true tuberculous matter; instances of which are recorded by Louis.

*Perforation of the pleura.*—One of the most distressing accidents which occur during the progress of phthisis, is the perforation of the pleura, and the consequent escape of air and purulent matter into its cavity. It is characterised by the suddenness of its occurrence and by the marked symptoms to which it gives rise; such as sudden pain in the side affected, accompanied with great oppression of breathing and extreme anxiety, which are speedily followed by symptoms of acute pleurisy. This accident coincides in character with the perforation of the intestine, the escape of feculent matter into the cavity of the peritoneum, and the violent inflammation of that membrane.

Perforation of the pleura for the most part occurs in the advanced stage of the disease when the patient's strength is greatly reduced, and in general proves speedily fatal. It has caused death in twenty-four hours; but when the symptoms are less acute, the patient has lived for thirty days, and Dr. Stokes states a case where the patient survived five months. A sudden attack of pain, on one side of a phthisical patient, with much oppression and anxiety, may be considered as indicating the accident. Louis, however, gives a case (xliv.) where oppression and anxiety indicated its occurrence without the presence of pain.

The perforation of the pleura may take place under two circumstances:—a tuberculous cavity, which communicates with the pleura by means of the perforation, may or may not communicate with the trachea. In the former case we have generally an effusion of air and fluid

into the cavity of the pleura, connected with which there is a peculiar symptom present, called *metallic tinkling*, or a clear fine sound resembling that produced by the falling of a pin on glass, and heard when the patient speaks. When there is no communication between the tuberculous cavity and the pleura and bronchi, or when there is an effusion of air only or a very small quantity of liquid, it was Laennec's opinion that there could be no metallic tinkling. Dr. Williams, however, has shown this opinion to be erroneous, and that neither communication with the bronchi nor liquid effusion is necessary to the production of the phenomenon:—he considers it to be nothing more than an echo or resonance which any sound or impulse propagated to a cavity of a certain form may produce.\*

Of eight cases of perforation which occurred to Louis, seven were on the left side,—a circumstance which he attributes to tuberculous disease being more frequent on that side, and often more advanced than on the right.

Perforation of the pleura generally takes place over a tuberculous abscess or cavern of considerable extent; yet cases occasionally occur in which a small softened tubercle immediately under the pleura bursts and discharges its contents, and this may be one of a very few contained in the lungs. Andral mentions a case of this kind where the lungs contained only five or six tubercles. In such cases, from the small size of the cavity, little or no effusion of pus or other matter takes place, and, consequently, such perforation is not necessarily followed by pleuritis.

The accumulation of air in large quantities in the pleura gives rise to the most distressing dyspnoea, and death generally follows, after a short interval, from impeded respiration. We lately met with one remarkable example of this kind: tuberculous disease was far advanced in the right side, while the left was but little affected; the patient was suddenly attacked with severe dyspnoea after a fit of coughing: the left side was found tympanitic, the intercostal spaces were distended, and no respiratory murmur could be heard. An opening was made between the intercostal space of the fourth and fifth ribs, from which the air rushed out with great violence and with considerable relief to the patient. Death, however, took place in twelve hours from the commencement of the attack. On opening the body, the right lung was found everywhere adherent and full of caverns and tubercles; the left was, for the most part, free; but in one part a dense though not extensive adhesion had been partly torn from its attachment, thereby causing a rupture of the pleura over a very small tuberculous cavity, through which the air passed freely from the bronchi into the chest, and gave rise to all the distressing symptoms. The history of this case affords a

good example of the mode in which the perforation is sometimes produced. This patient was seized, a few days before the accident, with acute pain in the left side of the chest, accelerated pulse, and other symptoms indicating an attack of pleuritis, which was combated by antiphlogistic treatment, and had entirely ceased two days before the accession of the dyspnoea. From the weak state of the patient the existence of effusion could not be ascertained during life, but after death it was found to have taken place to the extent of twelve or fifteen ounces; this, by separating the pulmonary from the costal pleura to a considerable extent, had produced a partial rupture of the cellular tissue which formed the adhesion, and which was elongated between the two pleurae to nearly an inch, and kept in a state of tension. In this state of the parts, the succession of the cough had torn through the pleura at the edge of the adhesion, and thus produced the perforation. We are indebted to Dr. Carswell for this ingenious explanation of the mode in which effusion may break up adhesions, and occasionally give rise to perforation.

In addition to the lesions we have described, which, in a greater or less degree, accompany the progress of the disease, there are others which frequently occur towards the termination of phthisis; but, as they also attend the latter stages of other chronic diseases, they cannot be considered as peculiar to it.

Inflammation of the lungs and of the pleura and pericardium, are among the most common intercurrent diseases which attend and complicate the last stage of phthisis, and not unfrequently cut off in a few days a patient who might otherwise have lived for weeks, or even months.

II. DISEASES OF THE ABDOMINAL VISCERA. The mucous membrane of the alimentary canal rarely escapes disease during the progress of tubercular consumption. A distinguished pathologist observes, "softening of the mucous membrane of the stomach, hyperæmia of the different portions of the intestines, ulceration of the small intestine, accompanied in many instances by a development of tubercles, are all of such frequent occurrence in phthisis, that they may be fairly considered as constituent parts of the disease."\* These morbid states of the alimentary canal generally occur subsequently to the pulmonary disease, although they occasionally appear to precede it; at least, it has occurred to us to observe the usual symptoms of diseased bowels some considerable time before those indicating disease of the lungs. This also accords with the experience of Andral, who observes that "these lesions may either precede or follow the formation of tubercles in the lungs; and in some cases the pulmonary and abdominal affections set in together." The stomach, the lower portion of the ileum, and the colon are the parts most frequently affected.

\* Rational Exposition of the Physical Signs of the Diseases of the Lungs and Pleura, by C. J. B. Williams, M.D., p. 139-46.

\* Andral, op. cit., vol. ii. p. 558.

*Morbid conditions of the Stomach.*—Inflammation of the mucous membrane of this organ is not an infrequent occurrence during the progress of phthisis. It generally comes on at an advanced stage of the disease; but we have frequently found it present, in a slight degree, at its commencement. The symptoms are loss of appetite, thirst, epigastric pain, and heat, with nausea, and sometimes vomiting. When the inflammation is situated in the anterior part of the stomach, the pain is generally much increased by pressure. Of one hundred and twenty-three phthisical patients observed by Louis, eight suffered from the present affection, and one only of this number was exempt from pain;—in the others, a sensation of heat and pain, much increased by pressure, was experienced in the epigastrium, and also a degree of resistance which was found to arise from enlargement of the liver. Ulceration of the stomach is accompanied by nearly the same symptoms.

It becomes a matter of some moment, in a practical point of view, to distinguish the vomiting which occurs in the course of phthisis, (and which is commonly attributed to the cough,) from that which depends on a diseased state of the stomach. A little attention to the concomitant symptoms will generally enable us to make this distinction. When the vomiting is simply the consequence of the cough, we find no epigastric tenderness or pain; the appetite remains, and the digestion, in the intervals of coughing, goes on well; in this case it frequently occurs at the commencement of the disease. When, on the other hand, it is the result of a morbid condition of the stomach, it is generally preceded for some length of time by loss of appetite and pain in the region of that organ—symptoms which continue and usually increase during the course of phthisis: the period, also, at which vomiting first occurs in this case is generally late in the disease.

We occasionally meet with another morbid condition of the stomach in tuberculous subjects, the nature of which is not fully understood; its chief symptoms are vomiting and pain. Louis considers it dependent upon softening and wasting of the mucous membrane; but the experiments of Dr. Carswell have clearly demonstrated that such softening of the coats of the stomach is a *post-mortem* change produced by the action of the gastric fluid: the red softening is essentially different in its nature, and is the result of inflammation. But, whatever be the pathology of the gastric affection at present under consideration, it is very distressing and difficult to remedy. According to the observations of Louis, it occurs from two to six months before death; but we have known it to exist for a much longer period, and even long before any symptom of pulmonary disease presented itself. In one young lady we saw it exist for several years; and it was only within a few months of death that the pulmonary disease became evident. The extent to which the latter was found after death, showed how

long it had remained latent, masked by the deranged condition of the stomach. We have another case at present under our care; this patient has retained very little on the stomach for the last eighteen months;—a few table-spoonfuls of some fluid being generally the extent of her nourishment for a whole day, and this is more frequently rejected than retained:—the emaciation, as may be imagined, is extreme. This patient is also a young female, twenty-five years of age, whose brother died lately of tuberculous consumption; she presents all the external characters of tuberculous cachexia, with a short dry cough, and will most probably die of phthisis at no very distant period, if the affection of the stomach do not prove fatal previously. The pain in the epigastric region is not great in this case, even on pressure; but in some it is so severe, and so entirely absorbs the patient's feelings and attention, that without minute observation on the part of the medical attendant, the pulmonary disease will escape notice. In general, the stomach can digest very little during this state, and then only the lightest nourishment. Occasionally the appetite returns for a time, but in other cases the mildest fluids are rejected. This occurred in the patient last alluded to; during a residence in the country for several months in the summer, the stomach retained and digested light food well; and she is, at this moment, able to retain more than she has for many months, although this only amounts to about a spoonful of fluid food two or three times a day.

*Enlargement of the Stomach.*—An increase in the size of the stomach has evidently an intimate connexion with phthisis, as Louis found it in more than two-thirds of the cases which he examined; while in two hundred and thirty subjects who died of other diseases, only two examples of this enlargement presented themselves. It sometimes goes on till the organ acquires double or treble its usual volume, and descends so far into the abdomen as to be on a level with the spine of the pubis.

The other lesions observed in this organ do not appear to be necessarily connected with phthisis, though their occurrence in the course of other chronic disorders is far less frequent. They consist of a thickened, reddened, mammellated, or ulcerated state of its mucous membrane.

The same lesions occur in the mucous membranes of the small and large intestines; but in these they appear to have a more intimate relation to phthisis, inasmuch as they depend on the development of tuberculous matter in the mucous follicles; where it is deposited in its usual forms, and after a time excites inflammation and ulceration of the surrounding tissues.

*Ulceration of the Intestines.*—Ulcers of the intestines, when first formed, are always small, and, from the locality of the mucous follicles, occur most frequently in the lower portion of the ileum, and chiefly in that part opposite its attachment to the mesentery, where the glan-

dulæ agminatæ are most numerous. In the large intestines the ulcerations occur irregularly. When the ulcerative process is once established, it often extends to the surrounding tissues; the neighbouring ulcers coalesce, and the mucous membrane is frequently undermined or destroyed to a great extent. Louis found them spreading to the length of nine inches, and running quite round the colon. Perforation of the intestine occasionally takes place, although it is a very rare occurrence.

The period at which ulceration is developed in the intestinal glands during the progress of phthisis, varies in different cases: in some they occur early in the disease, giving indications of their presence at the commencement of the pulmonary affection, and in a few rare cases, even at an earlier period; but more generally they appear when the disease of the lungs is considerably advanced. In a small proportion of cases the intestines are not affected.

The more early that ulceration of the intestines occurs, the more rapid in general is the progress of the disease, because it is usually accompanied with intractable diarrhœa, which speedily wastes both the flesh and strength of the patient. Louis found tuberculous ulceration in the small intestines in *five-sixths* of the cases which he examined, and noticed it almost as frequently in the large intestines, the mucous membrane of which often presented other diseased appearances, being red, thickened, or softened in one half of the cases; so that, of the whole number of phthisical cases examined by this physician, the large intestines were found in a healthy state through their whole extent in three instances only.

The mesenteric glands are very often found in a tuberculous condition in phthisical subjects, and more especially in children. Papavoine found them so in one-half of the cases of tuberculous diseases of children; while in the cases of adults examined by Louis, they were tuberculous in something less than one-fourth only.

*Disease of the Liver.*—The liver, in phthisis, presents one remarkable alteration of structure, which consists in an equable transformation of its substance into a fatty matter. This change appears to take place simultaneously over the whole organ, and to be intimately connected with the development of tubercles in other organs; for of forty-nine cases of this degeneration observed by Louis, forty-seven were phthisical; and of two hundred and thirty subjects who died from other diseases, it occurred in nine only, seven of whom had a few tubercles in the lungs. When far advanced, it soiled the scalpel and hands like common fat:—when the change existed in a less degree, its presence was detected by the impregnation of paper with fat, on a portion of the organ being enclosed in it and exposed to heat. This degeneration of the liver is marked by a pale fawn colour, diminished consistence, and increased bulk of the organ, which sometimes enlarges to double its usual size. The rapidity with which it takes place seems to depend almost entirely on that of the development of phthisis; for it has been found when this has run through all its stages

in fifty days. Its occurrence is modified neither by the patient's age nor strength of constitution; sex, however, has a decided influence, since of the forty-nine cases observed by Louis, only ten were males. The causes which conduce to this morbid change are very obscure: affections of the duodenum, which Broussais supposed to effect it, have been found by Louis to have no influence in its production. It is yet more remarkable that it is accompanied by no appreciable symptom except increase of bulk, and that the functions of the organ seem to go on undisturbed. The liver seldom presents other morbid alterations in phthisis: however, like all the other organs, it occasionally contains tubercles, particularly in children. A diseased state of the liver appears more frequent in some localities than in others. According to Desault, it is a very common occurrence at Bordeaux; so much so, indeed, that he scarcely met with a case of phthisis in which he did not find this organ enlarged during life. This is certainly not the case in this country; for, although a congested state of the liver is a frequent attendant on phthisis, and often long precedes it, still we believe that it does not often proceed to such an extent as to form, during life, a perceptible tumour in the abdomen.

*Fistula in Ano.*—This affection has been frequently found in consumptive patients, and has been supposed to be connected with the disease. Although we have often met with it, we have been unable to trace any connexion between it and phthisis, further than its probable dependence on abdominal venous plethora, which so often precedes pulmonary consumption. Andral states that the result of his observations does not confirm the opinion of a connexion between the two diseases.

It occasionally happens that death occurs suddenly in the course of phthisis. When this termination takes place, it is almost always in the advanced state of the disease, and in persons greatly reduced. The cause is often unknown. The patient does not appear worse than he has been for some days, when, suddenly, while sitting up, he falls back and expires. Examination after death does not always enable us to explain this sudden cessation of life. Louis gives two cases, in one of which œdema of the glottis appeared to be the cause; and in the other, a rapid hepatization of a large portion of the lungs; but neither of these pathological lesions could account for the cases to which we allude.

Among the causes of sudden death during the progress of phthisis, *pulmonary hemorrhage* may also be mentioned, as it is occasionally so profuse as to prove fatal in a few minutes. In such cases the blood flows from a considerable artery, the coats of which have been destroyed by ulceration in the progress of the tuberculous disease.

We cannot conclude this section without expressing our obligations to M. Louis, the able author of the *Traité de la Phthisie*. We are so much indebted to this zealous and indefatigable physician for all our more precise knowledge of the pathological anatomy of

phthisis, that we think it due to him to acknowledge the great assistance we have derived from his researches in the composition of this article; and we beg to refer our readers for more full information to his treatise, as they will not only find therein the best account of the morbid anatomy and symptoms of the disease, but will moreover learn to admire, and perhaps to imitate, the industry, the zeal, and the scrupulous veracity of this most accurate and philosophical observer.

#### SECT. VIII.—THE STATISTICAL HISTORY OF PHTHISIS.

The influence of age, sex, race, climate, &c., in disposing to tuberculous disease, and the more decided effects of various occupations and modes of living in the production of phthisis, form a very important part of our subject.

It is, however, to be regretted that the materials which have hitherto been collected are still too scanty to enable us to enter so fully into this question as its merits demand. But we trust that a subject of so much interest and utility will be soon elucidated by the more extended cooperation of numerous medical observers.

##### I.—Of the prevalence of tuberculous diseases at the different periods of life.

Tubercles have been found in various organs at every age, and examples are not wanting of their presence in the fetus, in which they usually occur in the form of transparent granulations, although they have been also found in the state of suppuration. Chaussier discovered miliary tubercles in the lungs of a fetus which died at birth, and an encysted abscess, or rather vomica, in the lungs of another.\* Oehler found the mesenteric glands swollen, hard, and of a fatty consistence, not only in the fetuses of scrofulous mothers, but of others who did not present any appearance of scrofula.† Husson reported to the Paris Academy of Medicine the dissection of two infants, one eight days old, and the other still-born at the seventh month of pregnancy, both of whom had tubercles in a state of suppuration; the former in the liver, the latter in the lungs.‡ Billiard, who examined a great many infants at the Foundling Hospital of Paris, found tuberculous granulations of the peritoneum in an infant who died four days after birth; and in two still-born children he met with evident tuberculous disease of the mesenteric glands.§ Although many other cases of the presence of tubercles in the fetal state might be cited, still the fact that Velpeau and Breschet never observed them in the course of their researches,|| and that M. Guizot did not find a single example of tuberculous disease

in four hundred new-born children whom he examined, is sufficient to show that its occurrence in the fetus is comparatively rare.\*

During the progress of infancy tuberculous disease is frequently developed. Billiard found tuberculous granulations of the spleen and liver in five infants whom he examined at the Foundling Hospital; in two of the cases there were also tubercles in the lungs: he also found tubercles in the lungs of four children in one year, all of whom appeared healthy at birth, but gradually fell into a state of marasmus, and died at the respective ages of one, two, three, and five months, without presenting any of the symptoms proper to the phthisis of adults.† We have not sufficient data to estimate the comparative frequency of tuberculous disease during the first two years of life, yet we are well assured, from observation, that the disease is not uncommon at this early age. We have met with several cases of infants dying of phthisis within the first year, in whom the lungs were not only extensively tuberculous, but contained large caverns with all the characters of those found in the lungs of adults. We have reason to believe that the disease in infants is frequently overlooked from the symptoms being less evident than in more advanced life, and from the want of the oral information afforded by the adult. The expectoration also is rarely seen in them, and the cough often assumes the character of pertussis; so that the disease is not infrequently mistaken for that or chronic catarrh.

After the second year of life, the great prevalence of tuberculous diseases has been remarked by many pathologists. M. Guersent, a physician of extensive experience attached to the Hôpital des Enfants Malades in Paris, where none are admitted below the first nor above the sixteenth year, is of opinion that tubercles existed in two-thirds or even five-sixths of the bodies which he examined.‡ The researches of M. Lombard,§ and more lately those of M. Papavoine,|| carried on in the same institution, have determined with great precision the frequency of tubercular affections, and the differences in their prevalence at various periods. From the records of deaths under fifteen years of age in the practice of the New Town Dispensary during two years, Dr. Alison is of opinion that the mortality from scrofulous diseases in the children of the lower orders in Edinburgh might be estimated much higher than one-third of the whole deaths.¶

The following table is calculated from six hundred and ninety-five examinations recorded by Papavoine and his colleagues. The bodies were examined with great care, and the tuberculous distinguished from the non-tuberculous for each year of age from the third to the fifteenth inclusive. It is, however, to be

\* Procès Verbaux de la distribution des prix aux élèves sages-femmes de l'Hospice de la Maternité, an. 1812, p. 62.

† Desormeaux, Dict. de Médecine, vol. xv. art. Œuf, p. 402.

‡ Ibid. p. 402.

§ Traité des Maladies des Enfants nouveaux-nés et à la mamelle, p. 648.

|| Thesis, p. 10.

\* Journal des Progrès, loc. cit.

† Op. cit.

‡ Clinical Reports, Journ. Hebdom. t. vii. p. 588.

§ Andral, Anat. Path., Townsend and West's Translation, vol. i.

|| Journal des Progrès.

¶ Trans. Med. Chir. Soc. Edinb.

observed that in two-fifths of the cases the tuberculous disease was not the cause of death. It is probable that the numbers here given express with considerable accuracy the relative proportion of the tuberculous to the non-tuberculous that die in the hospital, and perhaps among the poor of Paris generally; but since the children admitted are from the most indigent classes, and generally remain some time in the hospital, it may be supposed that the proportion of the tuberculous is exaggerated; as, however, Papavoine's observations do not include the deaths in the scrofulous wards, any error which may arise from these circumstances is thereby obviated. To exhibit the influence of age on the production of tubercles, our table was constructed by ascertaining the annual mortality in ten thousand individuals at each age, and setting down in opposite columns the proportions of the tuberculous and the non-tuberculous determined by Papavoine. Ten thousand children are supposed to be alive at the beginning of each year. The first column gives the age; the second is calculated on the law of mortality in France, (*Annuaire 1832*, p. 83,) and shows the total number of deaths in the course of the year; the third shows the proportion of tuberculous, and the fourth the proportion of children not tuberculous, that die in the ten thousand. The fifth column gives the number of tuberculous in a hundred deaths.

TABLE V.

Age.	Total deaths.	Tuberculous.	Non-tuberculous.	Tuberculous in one hundred deaths.
1	2630	100?	2530?	0
2	1290	161?	1129?	12?
3	729	292	437	40
4	408	204	204	50
5	263	173	90	66
6	178	130	48	72
7	125	87	38	70
8	99	74	25	75
9	82	52	30	63
10	78	52	26	67
11	77	44	33	57
12	78	47	31	60
13	80	60	20	75
14	84	56	28	66
15	89	47	42	52

From an examination of this table, we are led to conclude that age has more influence in determining tuberculous disease than all other appreciable causes taken together. The tendency to this process is five times more intense at one period of life than at another; it may, perhaps, be said that it is some hundreds of times more intense in the fourth year than at birth. The frequency of the disease is in no constant relation either to the mortality or the growth. Tubercles prevail most through the third, fourth, fifth, and sixth years, when the annual growth does not exceed one-tenth of the child's weight, and the mortality declines to nearly one in a hundred. Papavoine has committed an error in

stating that tubercles are generally most frequent in those periods of life when the mortality is least. If we refer to the table, the mortality is least (seventy-seven in the ten thousand) in the eleventh year, and forty-four in the ten thousand die tuberculous: the mortality is much greater in the fourth year (four hundred and eight in the ten thousand), and so is the number of tuberculous (two hundred and four). The error originates in supposing that the number of the tuberculous is as the relation of the tuberculous to the non-tuberculous among the deaths. M. Andral says, after M. Lombard, that "tubercles are most prevalent from four to five: they appear in much greater quantities, and in a greater number of organs at once."\* Now there is little doubt that the proportion of those who die tuberculous is at its maximum relatively to those who die without tubercles, about this period; but it is erroneous to suppose that a child aged five years is more liable to tubercles than a child aged three:—indeed the contrary is the fact, for only one hundred and seventy-three aged five, and two hundred and ninety-two aged three years, are tuberculous in ten thousand. M. Andral, depending on the accuracy of the calculations, has been led into the error of concluding that at this age every irritation or congestion is far more to be dreaded than in the preceding years, inasmuch as it may be followed by the production of tubercles.

More than one-fourth (27) of those that die from birth to puberty are affected with tuberculous disease; yet this causes death in about one-sixth only of the cases. From the third year upwards these proportions become two-thirds and one-third.

The great prevalence of tuberculous diseases in early life, which the researches of these pathologists have demonstrated, is a subject highly deserving the attentive consideration of the physician. The mortality from these affections in infancy and childhood is much greater than is generally believed; at least we can say for ourselves that although we had long had occasion to remark the frequency of phthisis in childhood, we were not aware of the extensive prevalence of the disease at so early an age, until we examined the results obtained by the French pathologists; and we believe that many of our readers will find themselves in the same position. The practical inferences to be deduced from the facts which have here been stated are sufficiently evident, and require little comment. They shew the paramount importance of attending to the health of infants and children, particularly in scrofulous families. But we shall have occasion to return to the consideration of this subject in a future part of the article.

With the view of ascertaining the comparative prevalence of tuberculous disease at different periods of life, we have examined all the statistical reports which appeared worthy of attention. The results of our researches concerning the relative prevalence of phthisis at different ages above puberty, as shewn in the

\* *Op. cit.* vol. i. p. 528.

following tables, are so conclusive as to preclude the necessity of any comment. Table VI. gives the numbers as we found them in the various works which we have consulted. Table VII., constructed from the first, gives the absolute mortality from phthisis, the number of persons in the thousand who die at each age in the different places, and the average of the whole. The comparison of this general average with any of the separate observations will shew the correctness of the results by the similarity which it bears to many of them. It will be seen that, with one exception, all these instances, although collected under different circumstances of time, place, &c., agree in shewing the greatest number of deaths to occur between the age of twenty and thirty; the next in proportion between thirty and forty; the next between forty and fifty; the succeeding grade of mortality being sometimes placed between fifteen and twenty, at other times between fifty and sixty, or even above sixty. This remarkable agreement of all the places warrants the conclusion that, after the fifteenth year of age, fully one-half the deaths from phthisis occur between the twentieth and fortieth years of age, and that the mortality from consumption is about its maximum at thirty, and from that time gradually diminishes.

TABLE VI.  
*Mortality from Phthisis at different ages.*

Place of observation.	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	Above 60
1 Edinburgh .....	6	9	13	8	11	8	6	3	9
2 Berlin .....	18	98	27	27	39	29	32	39	53
3 Nottingham .....	42	73	76	46	11	26	20	11	5
4 Philadelphia .....	182	974	875	565	338	258			
5 Chester .....	15	27	24	22	16	6			
6 Carlisle .....	15	45	34	31	15	15			
7 Paris—Louis .....	11	39	33	25	12	5			
8 Ditto—Bayle .....	10	23	23	21	15	8			
9 Charleston .....		26	24	13	21	4			
10 Ditto, whites .....		14	17	10	3	3			
11 Ditto, Blacks .....		15	15	9	3	3			

TABLE VII.  
*Showing the proportion, at different ages above fifteen, of one thousand deaths from Phthisis.*

Place of observation.	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	Above 60
1 Edinburgh .....	78	285	245	182	157	52			
2 Berlin .....	69	212	256	190	274	204			
3 Nottingham .....	117	416	271	134	45	17			
4 Philadelphia .....	59	305	275	178	106	81			
5 Chester .....	136	245	218	200	145	54			
6 Carlisle .....	97	390	219	200	97	97			
7 Paris .....	92	325	275	192	100	44			
8 Ditto .....	99	225	225	206	147	78			
Average of the above.*	99	285	246	185	108	78			

1. Reports of New Town Dispensary, three years, Edin. Journ. 1821-25.
2. Sussmilch Göttliche Ordnung.
3. Dr. Clark's Reports, 1806-10. Edin. Med. Journ.
4. American Journal of Med. Science, 1826-32.
5. Dr. Haygarth, Phil. Trans. vols. 64, 65.
6. Dr. Heysham on Mortality, &c. of Carlisle.
7. Louis, Traité de la Phthisie.
8. Bayle, Traité de la Phthisie Pulmonaire.

\* In comparing this average, it must be borne in mind that the first column embraces a period of five years only, while the others comprise ten years.

The researches of MM. Andral and Lombard have led them nearly to the same conclusions as those deduced from the preceding tables. The former considers that males after puberty are particularly subject to tubercles between the ages of twenty-one and twenty-eight; while females seem to be more exposed to them before twenty.\* The latter believes that after the age of puberty females are most liable to tubercles between their eighteenth and twentieth year, and males between twenty and twenty-five.†

The opinion of Hippocrates on this subject corresponds still more closely with the results obtained from our tables. That accurate observer fixed the age at which phthisis most frequently occurs, between the eighteenth and thirty-fifth year.‡

## II.—Of the influence of sex in determining the prevalence of Phthisis.

It has generally been believed that phthisis is more prevalent among females than among males; but the Paris Reports have been the chief sources from which statistical information on this subject has been obtained. It will, however, be seen by the following table that Paris forms a remarkable exception in this respect to the other places for which we have been able to collect materials for our calculations.

TABLE VIII.

Place.	Males	Females	Males.	Females.
1 Hamburg .....	555	445	10 to 8·7	
2 Rouen Hospital ..	55	44	10 to 8·6	
3 Naples Hospital ..	382	315	10 to 8·2	
4 New York .....	1584	1370	10 to 8·6	
5 Geneva .....	71	62	10 to 8·7	
6 Berlin .....	328	292	10 to 8·8	
7 Sweden .....	2088	1860	10 to 8·9	
8 Ditto .....	3054	3103	10 to 10·4	
9 Berlin .....	560	655	10 to 11·6	
10 Blacks, New York	47	58	10 to 12·3	
11 Paris .....	2219	2970	10 to 13·3	
12 Ditto .....	3965	5579	10 to 14·3	
13 Berlin, boys and girls	363	567	10 to 15·6	

1. Julius Nachrichten ueber die Hamburgischen Krankenhäuser, 1829.
2. Hellié, Clin. Méd. de l'Hôtel Dieu de Rouen, 1825.
3. Renzi, Topog. Med. di Napoli.
4. New York Med. and Phys. Register.
5. Chisholm on the Climate and Diseases of Tropical Countries.
6. Sussmilch Göttliche Ordnung.
7. Kön Swenska Vetenskaps Hand. 1801. Nicander.
8. Ditto, quoted from Marshall's Statistics of the British Empire.
9. Neue Berliner Monat Schrift, 1809, p. 225.
10. New York Med. and Phys. Register.
11. Conseil de Salubrité.
12. Chabrol, Statistique de la Ville de Paris.
13. Neue Berliner Monat Schrift, 1809, p. 225.

The two first columns in the preceding table give the facts as we found them; the two last columns show the relative deaths, ten being taken for the number of males.

The conclusions which might be drawn from

\* Op. cit. vol. i. p. 529.

† Op. cit. p. 29.

‡ Coan. Progn. 439.

this table are liable to error, from our neither knowing the relative number of the sexes alive in each place, their relative deaths from other diseases, nor their relative admissions into the hospitals referred to. The smallness of the numbers also allows any accidental circumstances to modify the result; so that any conclusion deduced from our materials can only be considered an approximation to the truth. In noticing the observations more particularly, we shall refer to the numbers given to each place in the preceding table.

*Nos. 1 to 7.*—The constant equal relation of the first seven numbers is certainly most remarkable, and appears to warrant the conclusion that ten males die phthisical for every eight or nine females, which is very nearly in the relation of the number of males born to that of females. It therefore goes far to prove that the sexes are equally subject to phthisis. *Nos. 8 and 9*, do not materially affect the preceding conclusion, as the preponderance of deaths among the females might probably be soon counterbalanced by more extended observations. *No. 10*, referring to the blacks, is rendered of little value by the small number of cases to which it refers, and by our ignorance of the relation of the sexes in a black population. *No. 13*, is a very curious observation; it does not, however, apply to the general calculation, for it refers to children only. If it be correct, it would show that, in childhood, phthisis is much more frequent among females than among males. *Nos. 11 and 12*, referring to Paris, are in direct contradiction to the first seven observations, and differ widely from *Nos. 8 and 9*, but approach 13 rather closely. They would show that the disease is more prevalent among females than among males in Paris by about one-fifth; and it is worthy of remark that other observations made in that city have led to the same conclusion. M. Lepelletier found that the number of phthisical females admitted into the hospitals of Paris were in relation to the males as five to three. From the data, however, which we already possess, it is evident that the law of comparative mortality from phthisis which results from the observations hitherto made at Paris, is not applicable to the comparative mortality from that disease in other places. We have no statistical reports in this country on a sufficiently extended scale, to enable us to institute a comparison on this subject between England and other countries.

### III.—Of the influence of certain occupations in inducing Phthisis.

Although from an early period medical writers have noticed the influence of certain occupations in producing pulmonary disease, it is only in late years that their attention has been more particularly directed to this very important subject. Those trades which expose the workmen to an atmosphere loaded with pulverulent bodies or charged with gaseous substances of an irritating quality, and sedentary occupations of all kinds are believed to exert a very deleterious action on the respiratory organs, and to cause pulmonary consumption; while, on the contrary, those which

require constant exercise in the open air are as generally considered to afford protection against this disease.

Up to a very recent period, writers on this subject contented themselves with giving the results of their observation in a general manner; but attempts have of late been made to determine the relative effect of different occupations by numerical tables. Of this kind are the observations of M. Benoiston de Chateauneuf, published in the *Annales d'Hygiène*, and the more recent researches of M. Lombard, recorded in the same journal. In order, by this method, to ascertain with precision to what extent phthisis is produced by the circumstances in which an individual is placed by particular pursuits, it would be necessary to ascertain the numerical relation which persons engaged in such pursuits bear to the whole population of the place, the relation of the deaths of such persons to the whole deaths, and, thirdly, the number of deaths from phthisis among the total deaths of each trade. Possessed of such data upon a sufficiently extensive scale, we might arrive at accurate conclusions respecting the influence of occupation in the production of this disease; and having established the aggregate effect of the circumstances connected with the exercise of any particular trade, we might be able, by a careful study of all such circumstances taken separately, to refer each of them to its proper place in the scale of causes, and determine the positive effect of each.

Researches of this kind, if carefully conducted, could not fail to lead to valuable practical results, by showing what alteration of circumstances might render any particular trade more salubrious. The materials, however, for such calculations do not exist, although they are essentially necessary to enable us to speak with precision on a question of so much importance. The most complete information which we at present possess on the subject is contained in the paper of M. Lombard already referred to; but unfortunately the calculations adduced by him to show the prevalence of phthisis in the different trades at Geneva, although very valuable in enabling us to approximate to the truth, are defective, inasmuch as the number of persons engaged in each trade is not stated. In consequence of this defect it is impossible to ascertain the absolute frequency of phthisis, and we can only determine its prevalence in relation to the total mortality in each trade, which may of course vary from many causes; and the most unhealthy trades in other respects may appear the most healthy in regard to phthisis. Our other sources of information are still more deficient in the essential elements of such calculations, so that in the present state of the subject we are unable to determine by numbers the relative influence of trades, and must therefore endeavour to arrive at the most probable conclusions by reasoning upon such general observations as we possess.

All the agencies enumerated by authors may be reduced to two classes, the first embracing those which act as local irritants to the lungs;



the second, those which exert an injurious effect on the whole economy. These two classes are so distinct in their nature that the evidence of their influence, and the consideration of the manner in which they lead to pulmonary disease, might be separately investigated with great propriety, if they were not so frequently combined in the same case.

The occupations which have been noticed by various authors as exerting a direct influence in irritating the respiratory organs and inducing pulmonary consumption, comprise a large proportion of our industrious mechanics; such as stone-masons, miners, coal-heavers, flax-dressers, brass and steel polishers, metal-grinders, needle-pointers, and many others who are exposed during their labours to inhale an atmosphere charged with irritating particles.

We have Dr. Alison's authority that there is hardly an instance of a mason, regularly employed in hewing stones in Edinburgh, living free from phthisical symptoms to the age of fifty.\* Mr. Thackrah remarks that masons are generally intemperate; they are exposed to the vicissitudes of the weather, to great bodily exertion, and to the inhalation of fine particles of sand, dust, and powdered stone: they are subject to chronic inflammation of the bronchial membrane and to pains of the limbs, and generally die before the age of forty.† Miners, as we learn from the same author, particularly while cutting through sandstone, are much exposed to inhale dust; but they also take large quantities of ardent spirits, and seldom attain the age of forty. Dr. Forbes also states that an immense proportion of the miners in Cornwall are destroyed by chronic bronchitis; one of the principal, though by no means the sole cause of which he considers to be the inhalation of dust.‡ Wepfer remarked the destruction of the miners in his time employed in cutting millstones from the mines of Waldschut on the Rhine, where all the men are said to have become consumptive.§

The inhalation of silex in a minute state of division is shown to be equally pernicious by Benoiston de Chateauneuf and by M. Clozier. The latter, speaking of the workmen in the quarries of St. Roch, says, "Quelque forts et robustes que soient ces ouvriers, les uns plutôt, les autres plus tard, mais ordinairement avant quarante ans, sont atteints d'abord d'une toux sèche," &c. and few reach the age of forty.|| The effects of this trade are so constant that the disease is commonly known by the name of "La Maladie de St. Roch." The evidence

of Chateauneuf is even more conclusive on this point:—the entire population of the small commune of Meusnes has been for the last hundred years exclusively employed in the manufacture of gun-flints. During this period the mortality has increased to a frightful extent, and the mean duration of life diminished in proportion.

The inhalation of metallic particles appears to be equally injurious to the respiratory organs, and perhaps as destructive of life. The pernicious effects of needle-pointing were long since described by Dr. Johnstone of Worcester,\* and Thackrah notices the operation of dry-filing cast-iron as most injurious to the workmen. The mouth and nose are blackened; the lining membrane of the nostrils, where the annoyance is first felt, discharges copiously; the fauces become preternaturally dry, respiration difficult; habitual cough succeeds, accompanied with derangement of the digestive organs and morning vomitings; and the common termination is bronchial disease, and no doubt often tubercular consumption: while on the other hand, dealers in old iron, whose clothes are covered with a thick brown layer of metallic dust, suffer no inconvenience. Thackrah attributes the mortality of the filers to the greater irritation of the mucous membranes of the respiratory organs produced by the angular particles of steel. The filers are remarkably short-lived; in the two principal machine manufactories at Leeds there were only two filers of the age of forty-eight. The men of these establishments are not intemperate; nor can their shortness of life be attributed to anything but their employment. But the history of the grinders of Sheffield, recorded by Dr. Knight, affords one of the most striking examples of the pernicious influence of the inhalation of mechanical irritants with which we are acquainted; and the deleterious effect of such inhalation is further illustrated by the difference between the health of the dry and wet grinders. The number of grinders "altogether amounts to about two thousand five hundred; of this number about one hundred and fifty, namely eighty men and seventy boys, are fork-grinders: these grind dry, and die from twenty-eight to thirty-two years of age. The razor-grinders grind both wet and dry, and they die from forty to forty-five years of age. The table-knife-grinders work on wet stones, and they live to betwixt forty and fifty years of age."† Dr. Knight is of opinion that the grit-dust is not only the most copious, but also the most injurious part of what is inhaled by the grinders. On comparing the diseases of these men with that of the other mechanics in Sheffield, he found that of two hundred and fifty grinders, one hundred and fifty-four laboured under disease of the chest; while only fifty-six were similarly affected in the same number of workmen engaged in other trades. On examining the

\* See his excellent paper in the first volume of the *Trans. of the Med. Chir. Soc. Edinburgh*.

† On the Effects of Arts, Trades, and Professions, &c. on Health and Longevity. By C. Turner Thackrah, Esq.

‡ Translation of Laennec, second edition, p. 137. For extensive statistical researches respecting the health of this class of men, see an admirable essay on the Medical Topography of the Land's End, by Dr. Forbes, in the second volume of the *Trans. of the Provincial Med. and Surg. Association*.

§ *Observ. de capitis affect.*

|| *Le Blanc, Œuvres Chirurgicales*, vol. i. p. 585.

\* *Memoirs of Med. Soc. Lond.* vol. v.

† *North of England Med. and Surg. Journal*, vol. i. p. 86.

respective ages of grinders and other workmen, he obtained the following results:—

Age.	Grinders.	Other workmen.
Above 30 .....	124 .....	140
35 .....	83 .....	118
40 .....	40 .....	92
45 .....	24 .....	70
50 .....	10 .....	56
55 .....	4 .....	34
60 .....	1 .....	19
	286	529*

Many more instances might be adduced to show the pernicious effects of mechanical irritants applied to the mucous membrane of the respiratory organs in producing fatal disease of the lungs; but the account of the grinders and flint-cutters which has just been given, is so conclusive that it is unnecessary to enter more fully into this part of our subject. There are, however, other circumstances in the history of these cases of chronic bronchial disease which deserve particular consideration, in addition to the question of pulmonary irritation which we have just discussed. In almost every instance the sufferers are exposed to causes fully adequate to the production of the tuberculous cachexia; they pass much of their time in a confined deteriorated atmosphere, often in a sedentary posture unfavourable to the free action of the respiratory organs; many of them are exposed to the vicissitudes of the weather, and the majority are addicted to the use of ardent spirits.

The influence of a confined and deteriorated atmosphere is shown in a remarkable manner in the fork-grinders confined to the town of Sheffield and those employed in the same occupation in the country. The former die, as we have stated, between the ages of twenty-eight and thirty-two; the latter generally attain the age of forty. In both cases the exposure to mechanical irritation is the same, and the habits of the grinders in and out of Sheffield do not differ; but the rooms in which the country workmen carry on their occupation are much better ventilated.

Persons employed in many other manufactories suffer in the same manner, but in a less degree. Feather-dressers and brush-makers, according to Chateaufort, are confined to close apartments, and generally work in a sitting posture. In the former trade the deaths from pulmonary disease amounted to 11·47 in the hundred, and in the latter to 7·76. Thackrah observes that in such trades the digestive functions are even sooner disordered than those of respiration. The process of flock-dressing appears to be most pernicious in this respect. "The subsequent sieving and examining of flocks produces great dust, and decidedly injures both respiration and digestion. In proportion to the degree and continuance of this

deleterious agent is the head affected, the appetite reduced, respiration impeded, cough, and finally bronchial or tubercular consumption produced:" (p. 66.) "Dressers of flax and persons in the dusty rooms of the mills," he continues, "are generally unhealthy. They are subject to indigestion, morning vomiting, chronic inflammation of the bronchial membrane, inflammation of the lungs, and pulmonary consumption."\* In all these cases the effect of the causes acting on the general system is made evident by the prominent place which disordered digestion, &c. hold among the symptoms enumerated. When disease is produced by bronchial irritation alone, these symptoms are not present, or occur only at a late period of the disease.

With respect to the nature of the pulmonary disease induced by the inhalation of mechanical irritants, of which the hard impalpable kind, according to the researches of Lombard, have the greatest influence, our information is still very defective. It is surprising, indeed, how few accurate examinations have been made and recorded of individuals dying under the circumstances described. The symptoms are so similar to those of tubercular phthisis, and are no doubt so often connected with this, that we shall only be able to state how far the mechanical irritation of the bronchial membrane contributes to the development of tuberculous disease, when we have a considerable series of well-conducted post-mortem examinations of mechanics employed in the operations referred to, and of others who are engaged in similar occupations without being at the same time exposed to the action of mechanical irritants on the organs of respiration. That there is sufficient disease to destroy life, and this with fearful rapidity and to an immense extent, is fully established; but we have no doubt that in many cases tuberculous disease has no share in it. Our opinion on this point will, we apprehend, be confirmed by the following summary of all the morbid inspections of the disease which we have been able to collect.

In the cases of the stone-masons of Edinburgh, reported by Dr. Alison, he enumerates the following as the appearances generally observed: "portions of the lungs hardened and condensed, others in a soft pulpy state, nearly resembling the ordinary texture of the spleen, and others loaded with effused serum, with much adhesion of the pleuræ and much effusion into the bronchi."† These are certainly not the appearances presented by tubercular disease of the lungs; and we quite agree with Dr. Alison that they were the consequence of inflammation.

Dr. Hastings, in his excellent work on Bronchitis, has recorded the examination of three leather-dressers, (his eighth, tenth, and eleventh cases,) who died from pulmonary disease excited by the inhalation of dust. In the first of these cases, the lungs were more solid than natural; the mucous membrane of

\* The disease which thus embitters the life of the grinder, and ultimately destroys him when he has scarcely attained one half the ordinary age of man, is generally denominated *grinders' asthma*, and often, from its great fatality, *grinders' rot*.

\* Op. cit. p. 71.

† Op. cit. p. 372.

the bronchi much inflamed, thickened, and containing several extensive superficial ulcers; the bronchi filled with purulent fluid mixed with blood; no tubercles were found. In the next case, the mucous membrane of the trachea and bronchi was highly inflamed and ulcerated; the air-cells were filled with mucus mixed with pus; the lungs strongly adherent over the whole surface, their substance was much gorged with blood; no tubercles. In these two cases, the heart was enlarged. In the third case, the bronchial membrane was thickened and ulcerated; there were many tubercles in both lungs, some of them in a state of suppuration. Dr. Knight has recently favoured us with an account of two cases which have occurred to him since the publication of his valuable paper in the North of England Medical Journal.\* Dr. Knight's first case was that of a fork-grinder, who died July 31st, 1831, at the age of thirty-eight, and had lost two brothers, also grinders, at the respective ages of twenty-four and twenty-eight years. The examination disclosed the following appearances: extensive adhesion of the pleuræ, especially on the right side; tubercles mostly in a crude state in both lungs; in the superior posterior part of the left lung was a mass of the appearance and consistence of cartilage, and the size of a pigeon's egg; upper part of the right lung indurated; numerous ulcers in the bronchial membrane, particularly of this lung, over which the adhesion of the pleura was most extensive and firm. Several bronchial glands were enlarged and indurated; the larynx and trachea were free from disease; heart of natural size. The immediate cause of this man's death was acute inflammation of the peritoneum and pericardium, presenting the usual appearances. The second case was a scissor-grinder, aged forty-seven, of a scrofulous habit, very temperate and industrious. He had for many years laboured under cough, at times dry, and at others accompanied with copious muco-purulent expectoration. The following appearances were observed on examination forty-eight hours after death: adhesions to a considerable extent between the pleuræ; upper part of both lungs emphysematous, particularly the right, which was gorged with blood to the extent of a large orange, but not indurated, immediately below the emphysematous portion. In the same lung were a large cretaceous mass inclosed in a cartilaginous cyst, and many tubercles in an indurated state. The left lung likewise contained many small hard tubercles, and at its posterior part a small collection of pus in a cartilaginous cyst. The bronchial glands were enlarged; the bronchial membrane was red, softened, and covered with pus and blood. Heart adherent to pericardium; many of the mesenteric glands enlarged and of cretaceous consistence;

mucous membrane of the stomach extremely vascular and softened, and thickly covered with red blood. The patient had vomited a pint of fluid blood a few hours before death.

Such, we apprehend, are the appearances which will be generally found in these cases, viz., vascular congestion and ulceration of the bronchial membrane, congestion or induration of the pulmonary substance, and adhesion of the pleura. They will probably be found in all cases, and, in many, complicated with emphysema, tubercles, and enlarged heart. The mechanical irritation of the respiratory organs, the sedentary habits and constrained position of the workman, the impure air in which he works, and his usual habits of life, are abundantly adequate to account for all these morbid changes; but we cannot admit that the mechanical irritation alone is sufficient to produce them. In two of Dr. Hastings's cases, wherein mechanical irritation of the bronchial membrane had been maintained for years together, extensive disorganization was thereby produced, and death caused without the formation of a single tubercle. In regard to Dr. Knight's second case, it may be remarked that the grinder was originally of the tuberculous constitution, and that he had passed the ordinary term of a grinder's life; and notwithstanding the constant irritation kept up in the lungs by his occupation, nature had made considerable advances to effect a cure of the tuberculous disease. We have already observed, with respect to Dr. Alison's cases of the stone-masons at Edinburgh whose occupation is constantly carried on in the open air, that no tubercles were found in the lungs. But there can be no doubt that a very considerable proportion of the persons will be found to have real tuberculous disease; as when a disposition to it exists, nothing is more likely to prove an exciting cause than the perpetual irritation produced by the inhalation of mechanical particles.

We shall now notice some circumstances which affect the general health of labourers, and thereby induce tuberculous cachexia. Among these none operate more injuriously in disposing to this morbid state than the deficient bodily exercise and the want of pure air which are generally united with sedentary occupations. Shoemakers, tailors, weavers, and dress-makers, may be cited among those who suffer most from these causes. Their sedentary position, the crowded and ill-ventilated apartments in which their labour is generally carried on, and the peculiar posture which they habitually assume, are eminently calculated to prevent the free exercise of the pulmonary organs, to diminish the powers of the system, to impair the nutritive function, and produce a corresponding depression of nervous energy. Their habits also are frequently careless and irregular; they adopt little precaution against the vicissitudes of temperature, expose themselves to the influence of cold and damp, and too often to the evils arising from dram-drinking, and to those other causes which are

\* We are gratified to learn that the objections to *post-mortem* examinations, which have hitherto been almost insurmountable, are beginning to abate; and we therefore trust that we shall soon have this subject fully investigated.

most likely to produce congestions, fevers, and inflammations. If the female dress-makers and other females employed in similar occupations are exempted from some of these causes, the total privation of exercise, the late hours and long duration of their work are more than sufficient to injure, if not destroy, their health in a few years.

Now in all these circumstances we find not only the conditions most favourable to the development of the general tuberculous diathesis, but those also which have a peculiar influence in promoting its manifestation in the lungs. The effect of sedentary habits in all classes and conditions of society is in our opinion most pernicious; and there is perhaps no cause, not even excepting hereditary predisposition, which exerts such a decided influence in the production of phthisis, as the privation of fresh air and free exercise. Indeed, the result of our inquiries leads to the conviction that sedentary habits are among the most powerful causes of tuberculous disease, and that they operate in the higher classes as the principal cause of its greater frequency among females. In this rank of society we find the mortality from phthisis below the average, almost all the active causes of the disease being removed. M. Egret\* found that only two males and five females died of phthisis, in seven hundred and thirty persons of this class treated by him during a period of ten years; and Lombard calculated that the disease is only half as prevalent among persons in easy circumstances as it is among the great bulk of the population.

There are certain trades which are generally considered unfavourable to the occurrence of phthisis; among these, seamen, butchers, and tanners hold the first rank.† It has been imagined that there is something in these occupations which has a special effect in preventing the development of tubercles, arising, in the one case, from the impregnation of the atmosphere with saline particles,—in the other, from peculiar properties in the atmosphere when impregnated with effluvia from dead animal matter or living vegetables. We have no belief in the special effect of such agents, but refer the exemption of these classes chiefly to the free and regular exercise in the open air which they enjoy.

The facts which we have adduced in this section, although they are, we admit, imperfect, may nevertheless lead to useful practical results. They not only open an interesting field of observation and inquiry, but suggest

measures for improving the health and condition of society, which are simple and in many cases available. We can only expect to see a decided diminution of disease among the industrious artisans of this country, when their workshops and apartments are more spacious and better ventilated,—when their physical powers are less exposed to the depressing influence of variable temperature, when they take more exercise in the open air, pay more regard to cleanliness, and cease to seek excitement in the pernicious habit of spirit-drinking.

#### IV. *Of the influence of Climate in the production of Phthisis.*

Our information respecting the influence of climate in the production of tuberculous disease is still very imperfect, and its operation as a predisposing and exciting cause has not been sufficiently discriminated.

A cold, damp, and variable climate, such as that of this country, not only gives the predisposition to the disease, but becomes its exciting cause, and determines in an especial manner its local manifestation in the lungs. Sir William Crichton states that “consumption is infinitely more frequent in Great Britain and Ireland, in comparison of their population, than in the northern parts of Russia; yet the climate of Russia is in general infinitely colder and ruder than ours. The scrofulous or strumous constitution is more common in the northern and middle governments of Russia than in England, and commits greater ravages and disfiguration than are ever witnessed in this country. Great Britain nowhere exhibits such dreadful effects of scrofula as Russia does; but in that empire its attacks are mostly confined to the external set of glands, to the face, the eyes, and throat, and to the bones, especially those of the extremities; the lungs suffer rarely, except in public schools, and among those who adopt the European dress and fashions.”\* There are, however, circumstances which must be taken into account in estimating the influence of the respective climates of Russia and England: the Russians clothe themselves more warmly, and take greater precautions against the severity of the climate than the English; on the other hand their poorer classes are worse fed, black sourish rye-bread and vegetables being their chief nourishment. The occupations also of the Russians are for the most part in the open air; whereas a large proportion of the labouring classes in England are employed in manufactories, in which they are shut up for the greater part of the day in a confined and deteriorated atmosphere.

Great heat appears also to have a powerful effect in predisposing to tuberculous disease. The general constitution of the inhabitants of very hot countries, as the Malays and negroes, may be cited in confirmation of this opinion, as both these races are well known to be much more subject to tuberculous disease than Europeans when exposed to the same causes.

\* *Annales d'Hygiène*, vol. vi. p. 46.

† We beg to refer the reader who is desirous of more minute information, to the writings of Dr. Beddoes, who has collected a considerable body of evidence on the subject of this section; to Mr. Thackrah's valuable work on the *Effects of Trades*; to Dr. Forbes's able *Memoir in the Transactions of the Provincial Medical and Surgical Association*; to the excellent articles of Benoiston de Chateaufort and our friend Dr. Lombard of Geneva in the *Annales d'Hygiène*, and of Dr. Knight and Dr. Kay in the *North of England Medical Journal*.

\* *Pract. Obs. on Pulmonary Consumption*, p. 50, &c.

We shall adduce further proof of this in the subjoined tables, containing a statistical account of the prevalence of phthisis in different countries.\*

TABLE IX.

*Showing the general result of our researches on the effect of Climate in determining the relative prevalence of Phthisis among the troops.*

Place.	Proportion of phthisis to the total deaths.
N. S. Wales and East Indies†	one-thirty-fifth
East Indies .....	one-thirty-third
Cape of Good Hope .....	one-seventh
Mediterranean .....	one-sixth
West Indies (Europeans) ..	one-fifth
Canada .....	one-fourth
France .....	one-third
Great Britain .....	one-third
Blacks in West Indies ....	one-third

The isolated facts relating to the prevalence of phthisis in different nations which we have collected from their statistical documents, are so discrepant and contradictory that no positive conclusions can be drawn from them respecting the effect of climate in producing the tuberculous diathesis. On this point, therefore, our information remains very incomplete, although by reference to the preceding table it is quite evident that the actual ravages of the disease decrease in a direct ratio with the increased warmth and equability of climate, and increase in the same ratio under opposite conditions; and it is a well-known fact that the inhabitants of warm climates, whether men or brutes, frequently fall a sacrifice to phthisis, when removed into colder countries.

To determine the influence of climate satisfactorily, we require an accurate table of the prevalence not only of pulmonary phthisis, but also of all the forms in which the tuberculous diathesis manifests itself among the inhabitants of different countries; for the influence of any climate in producing this diathesis cannot be estimated from tables illustrating the prevalence of one form of the disease among strangers to that climate, who of course brought with them that disposition to disease which their native country induced, and which we have no means of estimating.

We may, therefore, seem to have arrived too hastily at the conclusion that this disease is favoured by excessive heat, and is more prevalent among the negroes and Malay race. We have, however, been led to it by the study of their physical peculiarities, by the general character and course of their diseases, and by the fact that when these people are removed to Europe, the diathesis manifests itself rapidly

\* We avail ourselves of this opportunity to express our acknowledgements to Sir James M'Gregor and Sir William Burnett, to whose kindness we are indebted for the facilities afforded us of examining the valuable collection of journals and reports from the medical officers of the army and navy.

† The troops were employed in different parts of the East Indies in 1828, 1829, and 1830.

in its most characteristic form of crude tubercles, not in their lungs merely, but simultaneously in almost every organ of their body.

The two following tables have been compiled from the Army Medical Records, for the purpose of determining the greater prevalence of phthisis and other diseases of the lungs among the blacks than among Europeans in the West Indies. The first gives the relative mortality from phthisis, &c. among the blacks and whites of the West Indian army, for eight years, 1822 to 29.

TABLE X.

	Deaths from all diseases	Phthisis.		Other pulmonary diseases.	
		Cases	Deaths	Cases	Deaths
Whites	2275	318	177	3550	100
Blacks	555	221	158	1488	105

By our calculations from the above table, we find that in every thousand deaths among the whites, one hundred and twenty, or little more than one-eighth, are from pulmonic diseases; while in every thousand deaths among the blacks, four hundred and seventy-two, or nearly one-half, are caused by pulmonic diseases.

The following table has been constructed to show that phthisis is not only relatively but absolutely more prevalent among the natives than among Europeans in the East Indies. The table has been compiled from Mr. Marshall's Medical Topography of Ceylon. By adding together the items of his tables from 1815 to 1820 inclusive, reducing them to unity, and then dividing the total deaths per annum,  $\times 1000$ , by the average strength, we obtained the first column showing the absolute mortality in 1000 of each race during the equal period of one year. By dividing the deaths from phthisis per annum,  $\times 1000$ , by the average annual mortality, we obtain the second column; and by dividing the deaths from phthisis,  $\times 1000$ , by the total deaths, we obtain the third.

TABLE XI.

	Europeans.	Malays.	Caffres.	Indians.
Total deaths in 1000 persons during one year .....	142	36	49	45
Deaths from phthisis in 1000 persons during one year ....	6	2.0	7.0	2.6
Deaths from phthisis in 1000 deaths from all diseases .....	4.3	58	146	59

In concluding this section, we beg to express our thanks to our ingenious friend, Mr. Fergus, for assisting us in collecting materials for various parts of this paper. We are in-

debted to him for the six last tables which this section contains:—founded as they are on researches which have required great industry and labour, the task of collecting the materials and of making the necessary calculations has occupied more time than we could have devoted to it, and much more than persons unacquainted with such inquiries imagine. We also avail ourselves of this opportunity to express our thanks to Mr. Farr for the compilation and arrangement of the first, second, and fifth tables in this article.

#### SECT. IX.—OF TUBERCULOUS DISEASES IN ANIMALS.

The history of tuberculous disease in animals is a subject of much interest to the physician, inasmuch as it affords a collateral illustration of the disease in man.

We believe that tuberculous disease may be induced in any class of animals by those circumstances which produce it in the human subject, being equally influenced by climate, impure air, imperfect nutrition, deficient exercise, and other causes. Tubercles have been noticed in many orders of the mammalia, carnivorous and herbivorous, in birds, and perhaps in insects. Among the mammalia, they have been found in the lion, dromedary, horse, antelope, deer, cow, sheep, goat, domestic pig, monkey, guinea-pig, hare, rabbit, squirrel, and porpoise: among birds, in the psittacus erythæus and some other macaws and parrots, in the flamingo, house-sparrow, turkey, and domestic fowl. Mr. Owen, Assistant Curator of the Museum of the Royal College of Surgeons, informs us that he has discovered tuberculous disease in the following animals which died in the Gardens of the Zoological Society,—*felis caracal*, *Persian lynx*; *paradoxurus typus*, *paradoxure gennet*; *viverra Rasse*, *civet cat*; *herpestes mungos*, *Indian ichneumon*; *nasua fusca*, *brown coati mondi*; *ursus Thibetanus*, *Nepál bear of the Himalaya Mountains*; *tapirus Americanus*, *American tapir*; *alces Americanus*, *American elk*; *simia satyrus*, *ourang outang*; *Macacus cynomolgus*, *Macaque monkey*; *M. radiatus*, *bonneted monkey*; *M. lthesus*, *pig-tailed monkey*; *cercopithecus sabæus*, *green monkey*; *papio maimon jun.*, *Mandrill baboon*; *lemur nigrifrons*, *black-fronted lemur*; *lemur macauco*, *ruffed macauco*.

Our friend, Mr. Newport, a comparative anatomist of great promise, whose name is already favourably known by his researches into the minute anatomy of insects,\* has favoured us with an account of what he believes to be tuberculous deposits in that tribe. In the larva of the sphinx ligustri, or common privet moth, he met with a peculiar matter disseminated in small, irregular, aggregated masses, white, opaque, and of a cheesy consistence, over the whole internal surface of the insect, between layers of very delicate cellular tissue. These masses were most numerous among the muscles; on the exterior of the alimentary

canal, particularly the stomach; on the secretory silk glands, in the biliary ducts, and on the nerves. In the carabus catenulatus, or ground beetle, and in the staphylinus olens, both carnivorous feeders, he noticed similar deposits of more uniform and much smaller size in the cellular and pulmonary tissues: he has also detected appearances similar to those observed in the sphinx ligustri, in the common cray-fish, the astacus fluviatilis of Leach. It is worthy of remark that the sphinx was fed upon stale leaves of the privet for some days previous to examination, the unusual wetness of the season having prevented a fresh supply; the deposition of the same matter has also been produced by purposely feeding the insect upon deteriorated or stale food.

Although the existence of tuberculous disease in insects requires to be established by more numerous observations than have as yet been made, still the view which we take of the pathology of tuberculous disease inclines us to believe that no class of animals is exempt from it; we therefore have little doubt that the application of the causes which lead to it in the human species will also induce it in any animal which is exposed to their influence.\*

The morbid appearances presented on examination of the animals we have enumerated also bear a close analogy to those observed in man: the lungs, spleen, mucous membrane of the intestines, the liver, mesenteric, bronchial, and lymphatic glands, are the organs most frequently affected. We are, however, better acquainted with the morbid anatomy of monkeys, because, of all animals, that family is most subject to tuberculous disease; indeed, nearly all the monkeys in our menageries die tuberculous. Dr. Reynaud, of Paris, has devoted much research to this department of comparative pathology, and has published an excellent memoir on phthisis in the monkeys at the Jardin des Plantes.† In fourteen of these animals he found the lungs containing tubercles, and in many cases entirely converted into tuberculous matter. In three monkeys the disease was confined to the lungs exclusively; in the others various organs were at the same time affected. The larynx was ulcerated in two cases; the bronchial glands were always more or less tuberculous, and in one instance were so much enlarged as to obliterate the left bronchus and prevent respiration in the corresponding lung, which was much contracted. The spleen in six cases was much diseased, being enlarged and adherent to

\* All the milch cows in Paris become tuberculous after a certain period of confinement to the house. We have been informed that for some time after the disease has commenced, the quantity of milk obtained from them is greater than before, and their flesh is more esteemed by the unsuspecting epicure than that of the healthy animal. A circumstance of the same kind is mentioned by Aristotle, who observed tubercles in the pig, the ox, and ass; he says, in regard to strumous pigs, that when the disease (*grandines*) exists in a slight degree, the flesh is sweeter (*caro dulcior est*). *Historia Animalium*, lib. viii. cap. 21.

† Archives de Médecine, t. xxv.

\* See his papers on the *Sphinx Ligustri*, in the Phil. Trans. 1833 and 1834.

the peritoneum. The blood in the cells formed reddish clots, in the midst of which were tuberculous points. The tuberculous deposit was found in various stages of softening, and sometimes in caverns lined with a false membrane. In one case the tubercles were isolated and crude in the lungs, while in the spleen they were large and softened in the centre; showing that the spleen was the organ in which the tuberculous matter was first deposited.

The disease occurs in animals, as in the human species, at all ages. MM. Andral and Dupuy have even observed it in the fœtus of the sheep and rabbit.

SECT. X.—OF THE CAUSES OF TUBERCULOUS DISEASES, AND IN PARTICULAR OF PHTHISIS.

The causes of tuberculous disease, like those of most diseases, are referrible to two distinct heads, the remote and the exciting,—or those which induce the constitutional predisposition, and those which determine the local deposition of tuberculous matter after such predisposition is established. The one class of causes operates by modifying the whole system, the other by determining in a system so modified, the particular morbid action of which tuberculous matter is the product. Until this distinction between the causes of the constitutional and local disease is fully understood and acted on in practice, we shall make little progress in the prevention or treatment of tuberculous disease.

The share which these two classes of causes have in the production of tubercle varies in different cases. When the person is little exposed to the exciting causes, the constitutional predisposition may be long present without any local affection, while continued exposure to exciting causes may determine the local disease when the morbid state of the constitution exists in a slight degree. We have examples of the former among the wealthy classes of society, where we see the tuberculous cachexia prevail for a considerable time without the actual development of tubercles, because the person is little exposed to the usual exciting causes, and even sedulously avoids them; and we meet with instances of the latter amongst the poor, when engaged in occupations in the exercise of which the lungs are peculiarly exposed to irritation, by which a diseased state of the bronchial membrane and ultimately tuberculous disease are produced. Of this number are the numerous classes of mechanics, who breathe, for many hours every day, an atmosphere charged with fine particles of sand, metal, &c. But the most striking examples of consumption which have been adduced as the consequence of pulmonary irritation, occur in persons who are at the same time exposed to some of the most powerful causes of tubercular cachexia, such as sedentary occupations carried on in a confined and deteriorated atmosphere, and very often also to excessive indulgence in the use of ardent spirits; so that they are exposed

to the causes of the constitutional and local disease at the same time.

I.—Of hereditary transmission considered as a cause of phthisis.

That pulmonary consumption is an hereditary disease,—in other words, that the tuberculous constitution is transmitted from parent to child, is a fact not to be controverted; indeed we regard it as one of the best established points in the etiology of disease. But it may not be so generally admitted that various other morbid states of the parent produce the predisposition to tuberculous disease in the offspring; a position, however, which we hold to be equally true, and still more important in its consequences. A parent labouring under tuberculous cachexia entails on his offspring a predisposition to the same affection, proportioned to the degree of disease under which he labours. Examples of this fact are constantly present in the families of scrofulous parents, where we find the scrofulous constitution much more strongly marked in general in the younger than in the elder children. We even occasionally meet with families the first children of which are healthy, while the last are the subjects of tuberculous disease; the health of the parents having undergone a change during the increase of their family. There may be exceptions to this rule, depending on circumstances beyond our cognizance, but we have little doubt that it is generally true.

It has been made a subject of inquiry whether the child is more disposed to the diseases of the father or mother; and we believe the majority of authors give it in favour of the father: Professor Nassi, however, of Bonn, in his excellent essay on tuberculous diseases, expresses his opinion that the hereditary disposition is more frequently derived from the mother. The point is one which it is very difficult to decide. There can, we think, be no doubt that the child may inherit the constitution of either or both parents: on some occasions we see the constitution of the father, in others that of the mother, predominating in different children of the same family. It has also been remarked, and we think the observation is founded in truth, that the more a child resembles in its external lineaments one or other parent, the more certainly will it inherit the diseases of that parent.

But a state of tuberculous cachexia, as we have just remarked, is not the only morbid condition of the parent which entails the tuberculous predisposition on the children; there are several diseases which have that effect, the most frequent and important of which are a disordered state of the digestive organs and its consequences. Gout, cutaneous diseases, the injurious influence of syphilis or long courses of mercury on the constitution, debility from disease, age, &c.; in short, a deteriorated state of health in the parent from any cause, to such a degree as to produce a state of cachexia, may give rise to the scrofulous constitution in the offspring. However various the causes of the cachectic state of the parent, its effect is

constantly manifested in the disposition of the children to tuberculous disease. This is a most important fact in the history of consumption, and is highly deserving the attentive consideration of the profession.

It may appear that we are disposed to generalise too much in ascribing tuberculous disease in the offspring to morbid conditions of the parent; nevertheless we have not formed our opinion upon superficial observation, nor without mature consideration; and we feel persuaded that the more carefully the subject is investigated, the more correct will our views be found. We have frequent opportunities of remarking a strong disposition to this disease in the children of parents who enjoy what is usually termed good health, and in whose family no scrofulous taint can be traced; whereas, according to our own observation, we never see the parents in an unhealthy state, whatever the nature of their disease may be, without finding, at the same time, that the children are strongly predisposed to tubercles. An opinion is entertained that one generation sometimes escapes tuberculous disease, although their parents and children suffer from it. This is to be explained by the improved state of health enjoyed by the generation exempted, and by the other circumstances which counteract or prevent the development of tubercles.

Of all diseases, we consider dyspepsia the most fertile source of cachexia of every form, for this plain reason, that a healthy condition of the digestive organs and a proper performance of their functions are essential to the due preparation of the food, and consequently to the supply of healthy nourishment to the body. The adjusting powers of the system may do much to correct a disordered condition of the different functions concerned in the process of assimilation, by means of the increased activity of the healthy organs; but the system cannot continue long in a healthy state when any one important function connected with nutrition is materially deranged. Without, however, entering into this most interesting subject, we consider it an established fact,—it is so at least to us,—that dyspepsia and any other disease which induces a cachectic state of the parent, shows itself either in the tuberculous constitution of the children, or in their strong tendency to become the subjects of those disorders which generate such a constitution, such as that form of dyspepsia which has been denominated *strumous* by Dr. Todd, (see article INDIGESTION.)

A cachectic state of the system may also originate in a defective state of the various secretory and excretory functions, the effete matter not being fully carried off; and this cause very generally accompanies dyspepsia, and accelerates its deteriorating influence on the health. There are doubtless other circumstances in the state of the parents which may give rise to the strumous diathesis in their offspring, which are not so evident as those which we have noticed; and yet there can be

little question of their influence when we see children so often present the characters of the scrofulous diathesis at the earliest age, while their parents are in the enjoyment of good health, and free from all appearances of tuberculous disease, local or constitutional. Some remarkable examples of this kind have come under our observation, where whole families have fallen victims to tuberculous consumption, while both parents have not only enjoyed good health themselves to an advanced age, but have been unable to trace any hereditary disposition to the disease in their families for generations back. An imperfect development or a feeble state of the organs of generation has been considered a cause of scrofula in the offspring; anything which interferes with the act of conception or with the nourishment of the fœtus in utero, such as a disordered state of the mother's health, depressing passions, a sedentary or unhealthy mode of life, and whatever induces imperfect nutrition in the mother during pregnancy, may lead to such a result; and this may even explain why in some instances one child is predisposed to disease, while the others of the same family are exempt. It is quite impossible to define the various circumstances in the health of the parent which may give rise to the scrofulous disposition in the child, much less to explain their operation: we rather allude to them as subjects deserving the investigation of the general pathologist and practical physician. That tuberculous disease can generally be traced to an hereditary origin, will not be disputed by any medical observer who has given his attention to the subject; but there may be a difference of opinion as to the particular condition of the parent which induces the tuberculous constitution in the offspring, and also as to the degree in which this constitution may exist in the child at birth. We have already stated our opinion respecting the former, and we shall now give our views respecting the latter of these conditions.

1. We have seen that in a very small proportion of cases the child is tuberculous at birth. This, we believe, will rarely occur unless one or both parents are labouring under tuberculous disease in a very advanced stage.

2. The next degree of hereditary disease is that in which the infant is afflicted with tuberculous cachexia from birth,—a state which requires very slight exciting causes to determine the deposition of tuberculous matter in some of its organs; which in such cases occurs early in life, the child often dying tuberculous within the period of infancy. This is a frequent occurrence in the children of consumptive parents.

3. Again, the child presents all the characters of the tuberculous or scrofulous constitution which have been already noticed, and without care will probably soon acquire tuberculous cachexia and die of tuberculous disease in early life. The greater number of scrofulous and consumptive cases which we meet with in



childhood and youth are referrible to this degree of hereditary disease.

4. In another class of cases, the child is merely predisposed to those functional derangements which generate the tuberculous constitution. The cases of predisposition to consumption which come under this class are, according to our observation, the offspring of parents who have laboured under dyspepsia, gout, cutaneous diseases, and other deranged states of health not of a tuberculous nature. They constitute the most numerous and the most remediable of all the classes; and yet, we take leave to add, they are the least generally understood.

This view of the hereditary causes of tuberculous disease we consider of great practical importance, as it is only by our acquaintance with the mode and degree in which the hereditary predisposition affects the constitution, and the circumstances on which its increase depends, that we shall be enabled to direct the management of the child so as to correct the constitutional predisposition, and obviate those derangements which increase it.

II.—*Of the causes which give rise to tuberculous cachexia in individuals not hereditarily predisposed to phthisis.*

The earlier in childhood the causes of tuberculous cachexia are applied, the more speedily will this be induced. If, for example, an infant born in perfect health, and of the healthiest parents, be insufficiently or improperly fed, that is, be nursed by a woman whose milk is inadequate in quantity or quality to afford due nourishment; or if the child be fed on other food ill-suited to the state of the digestive organs, or be kept in close rooms in which free ventilation and cleanliness are neglected, a few months will often suffice to induce tuberculous cachexia. The countenance will become pale, the flesh soft, the limbs emaciated, the abdomen tumid, the evacuations fetid and unnatural. The external lymphatic glands, especially those of the neck, will enlarge and become tuberculous, and the child will speedily fall a victim to tuberculous disease; and this may happen in a family in which the brothers and sisters of this infant who have been properly suckled and reared with care and in pure air, attain a healthy maturity. We may thus see the change from perfect health to complete tuberculous cachexia effected in the infant in the course of a few short months. Now, if this occurs in a strong infant, born of healthy parents, and perfectly healthy at its birth, how much more certainly and rapidly will the same effects be produced in a feeble infant born of unhealthy parents, or, still more, of parents absolutely scrofulous? Again, take a child of three or four years of age, in perfect health, having been born without any hereditary predisposition to disease, well-nursed, and properly nourished,—let it be fed upon coarse innutritious food, and confined in close apartments, where neither the heat nor light of the sun have free admission, and where the ventilation is imperfect, and we

shall soon see the blooming healthy child changed into a pale, sickly, leucophlegmatic creature,—a fit subject for tuberculous disease. This will occur during the whole period of youth, a longer time being required to effect the constitutional deterioration; but in all cases it will vary according to the number and force of the causes and the power possessed by the individual to resist their operation.

Up to the period of the full development of the system, till the body has ceased to increase in stature, till it has reached maturity and acquired the stability of the adult, tubercular cachexia may be readily induced. After maturity the powers of the system in resisting the causes of disease are greater than at an earlier period; still we see the same results produced by similar causes,—the constitutional affection being the same, although it manifests itself more slowly and in a different manner, according to the age and peculiar constitution of the individual. As we increase in years, a more powerful or longer application of the causes is required to induce tuberculous cachexia, but we are not satisfied that this rule holds good after a certain period of advanced life. In old age, it has appeared to us that tuberculous cachexia is acquired more easily than about the middle period of life; but we admit that our facts are not sufficiently numerous, and have not been observed with enough of care to enable us to speak with confidence on this point.

The principal causes which induce tuberculous disease may be arranged under the heads of improper diet; deficiency of pure air, exercise, clothing, and cleanliness; excessive labour and affections of the mind.

*Improper Diet.*—Of the remote causes, the leading are those circumstances which interfere with the nutrition of the body; among these the imperfect supply of food holds a conspicuous place. But we have rarely an opportunity of seeing the effects of this alone, because when the means of procuring proper nourishment are wanting, there are generally other causes of the disease in action at the same time; such as residence in ill-ventilated and dark apartments, exposure to cold from imperfect clothing, &c. the whole of which are often combined, and hence more speedily effect the deterioration of the health. Food in excess, or of a kind too exciting for the digestive organs, may also induce tubercular cachexia,—a circumstance which is not sufficiently attended to,—we may say not generally understood, even by medical men: nevertheless we hold this to be a frequent cause of scrofula, and believe that it produces the same effects on the system as a deficient supply; the imperfect digestion and assimilation in the one case, and the inadequate nourishment in the other, being equally injurious: the form and general characters which the disease assumes may differ, but the ultimate result will be the same in both cases. The adaptation of the food, both in quality and quantity, to the age of the individual, as well as to the powers of the digestive

organs, is too little considered; and the evil consequences of this neglect are often evident in the children of the wealthy classes of society, who are frequently allowed an unrestricted use of the most exciting kinds of animal food.

*Impure Air.*—Next to improper food, we rank an imperfect supply of pure air. It is in the lungs that the assimilation of the chyle is completed; and when either the respiration is imperfectly performed, or a sufficient supply of air is wanting, perfect assimilation is prevented.

In the confined abodes of the poorer inhabitants of large and populous cities, where neither pure air nor sufficient light can enter, in consequence of the obscure and overshadowed sites of the buildings, the food cannot be assimilated even though the supply be unexceptionable. A sensible writer on scrofulous diseases considers impure air as the only real cause of scrofula; other causes may assist, but this he considers essential to the production of the disease. "Personal experience," says Baudelocque, "reading, reflection on a great number of facts, and the analysis of many observations, have impressed me with the deep conviction that there exists one principal cause of scrofulous disease, a cause which predominates over all others, and without which, perhaps, the disease would never, or at least very rarely develop itself. This cause consists in particular conditions of the atmosphere in which the individual resides. However ill-chosen or unsubstantial his food may be,—however much cleanliness may be neglected—whatever be the nature of his clothing and its adaptation to the temperature—whatever the climate in which he lives, the exercise he takes, or the duration of his sleep and waking,—if the house in which he dwells be placed in a situation to which the fresh air and the sun's rays have free and direct access, and the house itself be sufficiently airy, light, and well-proportioned to the number of its inmates,—scrofulous disease will never make its appearance. On the contrary, however well-chosen and nutritious the food, however minute the attention paid to cleanliness, with whatever care the clothing be adapted to the temperature, or the duration of exercise, sleep, and waking be regulated,—if the houses are so placed that the sun's rays cannot reach them, or the fresh air cannot be renewed without difficulty,—if, in short, they are small, low, dark, and badly aired, scrofulous disease will inevitably supervene."\*

Though we are fully satisfied of the powerful influence of impure air in the production of scrofula, we cannot entirely coincide with M. Baudelocque. We believe that the other causes which we have mentioned are capable of inducing tuberculous cachexia, while the patient is breathing a very pure air. We find the disease not infrequently affecting the inhabitants of elevated and dry countries, where the atmosphere is pure and the people are oc-

cupied in grazing sheep and cattle, and are hence so much in the open air during the day that the confined atmosphere of their ill-ventilated hovels can scarcely be considered the chief cause of the scrofulous diseases by which they are often afflicted, since we have other and more evident causes in the coarse and innutritious vegetable food which forms almost their only sustenance, and in their scanty clothing and exposure to the inclemency of the weather. But there can be no doubt that the habitual respiration of the air of ill-ventilated and gloomy alleys in large towns, as well as that of many manufactories, workhouses, and even schools, is a powerful means of augmenting the hereditary disposition to scrofula, and even of inducing such a disposition *de novo*. Children reared in the workhouses of this country and in similar establishments abroad almost all become scrofulous, and this more, we believe, from the confined impure atmosphere in which they live and the want of active exercise, than from defective nourishment.

*Deficient Exercise.*—Deficient exercise ranks next as a cause of tuberculous disease. If a due supply of proper nourishment and pure air is necessary to nutrition, bodily exercise is equally necessary to apply such nourishment to the growth and development of the body. The amount of exercise necessary to produce this effect and to maintain a healthy state of the system, will vary according to the age and nature of the constitution; but without such exercise there can be no sound health.

*Excessive Labour.*—While a certain quantity of exercise is necessary to the maintenance of health, excessive labour, by debilitating the body, may be ranked as a cause of disease. It operates on the whole system, though, according to the mode in which the fatigue is produced, one set of organs may be more affected than another; and when these are overworked and require an excess of nervous influence, others must suffer from a deficient supply. When the labour is carried on in confined apartments, its injurious effects are more decided.

*Improper Clothing.*—Proper clothing is essentially necessary to the preservation of health. An imperfectly covered state of the body in the cold season, especially in persons engaged in sedentary occupations where exercise does not assist the circulation of the fluids, is most injurious, especially to young persons, in whom it is necessary to maintain a vigorous circulation through the extreme parts of the body in order to ensure its growth and development, to secure the due performance of the cutaneous secretions, and to prevent sanguineous congestion of the internal viscera. These objects cannot be effected without exercise and warm clothing.

While on this subject, we must advert to the pernicious effects of the modern system of female dress. We consider the free expansion of the chest and unimpeded action of all the muscles connected with respiration, as highly

\* *Mémoire sur les Scrofules, Revue Médicale, 1832, vol. i. p. 10.*

conducive to health, and as one of the means of obviating pulmonary congestion. The employment of tight stays and other forms of dress which impede the full and free action of the respiratory organs, cannot be too strongly reprobated. This, however, has been so well explained in the excellent article on *PHYSICAL EDUCATION*, that it is unnecessary for us to say more than express our concurrence in the views therein promulgated on this important subject.

*Want of Cleanliness.*—Cleanliness is also essential to health, and inattention to it is another common cause of disease; and although this may be less powerful than those causes which have just been mentioned, still it has its influence. Without attention to cleanliness, the functions of the skin cannot be properly performed, the effects of which in producing tuberculous cachexia we have elsewhere explained.

*Abuse of Spirituous Liquors.*—Among the causes of tuberculous cachexia, a free indulgence in ardent spirits holds an important place. While it is one of the most powerful means of debasing the morals and of extinguishing the best feelings of human nature, this pernicious habit is no less effective in destroying the physical constitution. We believe that the abuse of spirituous liquors among the lower classes in this country is productive of tuberculous disease to an extent far beyond what is usually imagined. Indeed, it is only necessary to observe the blanched cadaverous aspect of the spirit-drinker, to be assured of the condition of his internal organs. The tale of his moral and physical degradation is indelibly written on his countenance. Nor does the evil rest here—he not only destroys his own health, but entails on his unfortunate offspring the sure disposition to tuberculous disease.

*Mental causes.*—Too close application to study is a powerful cause of tuberculous diseases. It operates in several ways:—it necessarily implies sedentary habits, and hence exposes to all the evils which have their origin in want of exercise, such as imperfect digestion, constipated bowels, &c. In addition to these, the sensorium is so much exhausted by excessive exertion, that the nervous system generally is weakened, and the various organs of which the functions are essential to health are deprived of their due proportions of nervous influence.

Mental depression holds a very conspicuous place among those circumstances which diminish the powers of the system generally, and often proves one of the most effectual determining causes of phthisis. Disappointed hopes which have long been cherished, slighted affections, loss of friends, and reverse of fortune exert a powerful influence in inducing phthisis in persons predisposed to the disease.

Various other causes of consumptive diseases have been noticed by authors. Hard water, that is, water holding an unusual quantity of calcareous matter in solution, has been recorded among these causes, and the evidences of this are sufficiently strong to show that such

water has an influence in the production of scrofula. The effects of the water at Rheims, related in the *Memoirs of the Royal Society of Medicine at Paris*, has often been adduced as a striking example.\* Heberden† and Cullen‡ have both noticed the influence of this cause; and we may refer the reader to the various works of Dr. Lambe, who has gone into minute details on this subject. It may be difficult to explain how hard water produces such an effect; but the fact should be sufficient to guide us in our selection of a residence for children, more especially for those of a tuberculous constitution. Mercury, when used so as to affect the system, has been very generally considered capable of inducing tuberculous disease. We are inclined to believe this, and therefore consider that its use requires the greatest care in persons of a delicate or strumous constitution.

*Contagion.*—There remains another imputed cause to be mentioned, viz., contagion. The contagious nature of phthisis has been believed by some authors of high authority, at the head of whom may be placed Morgagni, and altogether disbelieved by others. In the south of Europe the general opinion is in favour of contagion, in the north of Europe against it. The subject is one that scarcely admits of being confirmed or refuted. It would, therefore, be profitless to occupy the pages of this work in adducing authorities or in detailing opinions on a subject on which every medical man in this country has too frequent opportunities of making his own observations and forming his own judgment. The view which we take of tuberculous cachexia, without which tuberculous disease of the lungs in our opinion cannot occur, leads us entirely to disbelieve that phthisis can be communicated by contagion. But we consider that the practice of sleeping in the same bed, or even in the same room with patients in the advanced stage of phthisis, is highly objectionable, because the rooms of the consumptive are rendered peculiarly injurious to health by the nature of the disease, and the confined atmosphere and high temperature in which they are too often kept.

Reviewing what has been said respecting the causes of tubercular cachexia, they may be stated generally to comprehend all those circumstances which debilitate, and increase the irritability of the system, impede the due digestion and assimilation of the food, diminish the various secretions and excretions, and induce internal sanguineous congestion. Defective assimilation,—from whatever cause it proceeds,—whichever be the first link in the chain of morbid actions which derange this process or series of processes,—induces, according to our view, tuberculous cachexia; and whether the primary error exist in the inadequate supply of food, or in the incapacity of the organs to extract from this the elements of

\* Mém. de Soc. Royale de Méd. vol. ii. p. 280.

† Commentaries, p. 362.

‡ Materia Medica, vol. i. p. 406.

nutrition, to assimilate and apply them to the reparation, growth, and various purposes of the animal economy, the ultimate result is the same.

Seeing that the causes which produce tuberculous cachexia are so numerous, we should be extremely cautious in estimating their power, and in attributing to any of them specific properties. Whenever their combined effect is such as to depress the vital energy, and lower the power of assimilation beyond a certain degree, the tubercular diathesis will be produced: whenever, on the contrary, the nutritive functions are vigorously carried on, this disposition will not manifest itself, however strongly it may be favoured by the separate action of any one of the causes in the degree in which it is usually applied.

### III. *Causes determining Tuberculous Disease of the Lungs.*

The chief causes that come under this head may be divided into two classes: those which act immediately on the lungs, and those which act partly on this organ and partly on the general system. 1. To the first class belong bronchitis, pneumonia, hemoptysis, pertussis, and some other pulmonary affections.

*Bronchitis.*—Irritation and inflammation of the mucous membrane of the larynx, trachea, and bronchi, are considered a frequent cause of tubercles. Certain it is that no affection so commonly appears to precede tubercular phthisis as bronchial irritation. This circumstance may be accounted for in two ways. The pulmonary mucous membrane of tuberculous subjects is more susceptible of the impressions of the causes which produce congestion and irritation, such as vicissitudes in the temperature and humidity of the atmosphere, or mechanical irritants conveyed into the air-passages during respiration, —and tubercles often prove a source of bronchial irritation some time before their presence is indicated by other symptoms. But we also readily admit that repeated attacks of bronchial inflammation, or the long-continued application of mechanical irritants to the membrane of the bronchi, may prove the exciting cause of tubercles, when the constitutional predisposition exists.

In some instances the irritation commences in the larynx, and from thence appears to extend to the trachea and bronchi; the patient in this case is subject to frequent attacks of laryngeal irritation, which are usually excited by exposure to a cold humid atmosphere: there is a sensation of uneasiness in the larynx, and after a short time an increased secretion of mucus, with frequent hawking to remove it; generally, also, more or less hoarseness is present, and some cough. In other cases the person suffers from repeated attacks of inflammation of the internal fauces, and from thence the disease seems to extend to the larynx. After a series of attacks of laryngeal irritation have occurred, one, more obstinate than the others, does not subside, but continues and is soon accompanied by a cough; or should this symptom have existed previously, it is increased in severity; and the uneasy sensations, which

were at first confined to the larynx, are now felt under the upper part of the sternum, and soon extend over the whole chest. The cough likewise becomes deeper, calling into action all the muscles of respiration. A patient may continue in this state for a considerable time, without fever or any other symptom, except the uneasiness of the chest and the cough; the latter of which gradually becomes more troublesome, and medicine is found to do little more than palliate it.

Such a patient is commonly said to have an "affection of the trachea," although in truth the tracheal portion of the mucous membrane is that which is the least affected, and when affected produces the least irritation: for extensive ulceration is frequently found in this part without giving any signs of its presence during life.

In another class of cases (and these are the most numerous) the morbid state of the mucous membrane commences in, and is chiefly confined to the bronchi; the larynx and trachea appearing to be little affected. The patient is liable to pulmonary catarrh on the slightest exposure to cold; during the whole winter and spring one attack succeeds another, so as scarcely to leave an interval of a few weeks free from cough. This state of bronchial disease often continues for many years in persons even of a tuberculous constitution, without terminating in phthisis, and has been termed tubercular bronchitis. The subjects of these chronic bronchial affections, when they occur in early life, are generally persons of great delicacy of constitution. Their cases are extremely puzzling, and without the aid derived from the physical signs of pulmonary disease, the medical attendant will remain ignorant of the nature of the disease. With care such patients may be preserved for many years; but after a shorter or longer period the catarrhal affection generally becomes permanent, the respiration is more oppressed, the pulse habitually frequent; and the emaciation, which had varied according to the severity or duration of the catarrhal attacks and the length of the intervals between them, now remains or progressively increases. The aspect of the patient is also much changed, and the symptoms collectively leave little doubt that tuberculous disease is established in the lungs. These cases of long-protracted catarrh preceding the manifest existence of tuberculous disease, afford the strongest evidence of the influence of bronchial irritation in exciting phthisis; and we have no doubt that when the least predisposition to tubercular disease prevails, long-continued disease of the bronchial membrane leads to the deposition of tuberculous matter in the extreme branches of the bronchi and the air-cells.

But, as M. Andral observes, "what ought never to be lost sight of is this, that in order that inflammation of the mucous membranes of the air-passages shall be followed by the production of pulmonary tubercles, it is necessary to admit a predisposition. This being admitted, we can easily conceive how in one

individual very slight bronchitis is sufficient to produce tubercles, whilst others do not become phthisical from the most severe and long-continued pulmonary catarrh."\*

The bronchial affections which we have just noticed are those which are met with in all classes of life, and are for the most part the consequence of exposure to a cold and humid atmosphere, or the alternation of this with hot rooms. Another fruitful source of bronchial irritation, originating in those occupations which expose the labourer to breathe an atmosphere loaded with particles of matter which mechanically irritate and excite permanent disease of the bronchial membrane, has been noticed in a former part of this article.

*Pneumonia.*—Inflammation of the pulmonary tissue next claims our attention, as being considered a frequent, and, by some authors, the chief cause of phthisis. The question of inflammation as a cause of tuberculous disease has been already treated so fully in the preceding article, (TUBERCLE,) and we accord so perfectly with the opinions of the author, that it is quite unnecessary to enter on the subject here. Although we believe inflammation incapable of producing tubercles in a healthy subject, we are of opinion that it may prove a determining cause in a tuberculous constitution; and on this account the most sedulous care should be taken to prevent its occurrence in such subjects, and to remove it when it has taken place. Pneumonic inflammation is one of the worst evils that can befall a patient already labouring under tuberculous disease of the lungs, as it never fails to increase the mischief, and frequently converts that which was latent, and might have long remained so, into active disease. It promotes the softening of the tubercles, and renders the pulmonary tissue at once incapable of the functions of respiration, and a fit nidus for the further deposition of tuberculous matter. Indeed, we shall not err far, we believe, in stating that in proportion to the extent of pneumonic inflammation, will be in general the rapidity of phthisis. It is chiefly in those persons who, without suffering from extreme debility, are little liable to inflammation, that we observe phthisis protracted to a great length; the tuberculous disease passing slowly and gradually through its various stages, and often arriving at a considerable extent without producing much febrile disturbance.

*Hemoptysis.*—Pathologists differ in their opinion respecting the influence of hemoptysis, as we have already had occasion to remark while on the subject of diagnosis. One class of authors regard the effusion of blood as the consequence merely of the presence of tubercles; while some others consider it a cause of the disease. M. Andral believes the hemoptysis to be at once a proof and consequence of pulmonary congestion, which he considers necessary to the formation of tubercles; and having also on several occasions found, both in man and in the horse, tubercles deposited in

the coagulum of blood which is the result of pulmonary apoplexy, he concludes that in this way the effusion of blood may become an exciting cause of the disease.

There can be no doubt, we think, when we attend to the history of the cases in which hemoptysis occurs, that it is very generally a consequence of tubercles in the lungs, or at least occurs subsequently to their formation; although it may originate in simple pulmonary congestion.

It is to be regretted that in the accounts of this and other diseases adduced as causes of phthisis, the patient's previous health and the diseases of his family are not stated. The cases of French authors, which in other respects are detailed with such praiseworthy care and minuteness, are often defective on this point. It is a kind of information which is not sufficiently appreciated, and we have had constantly to lament the want of it in our examination of works on the subject of this article.

*Pertussis.*—Whooping cough occurring in a predisposed subject may lead to the deposit of tuberculous matter in the lungs, but we are not aware that it is a frequent cause.

2. We now proceed to consider the second class of causes, which embrace various diseases affecting the general system, and which have been considered capable of giving rise to phthisis.

*Fevers.*—Fevers, both continued and intermittent, are not infrequently followed by the disease so closely as to make them appear in the light of exciting causes. Portal gives a chapter on a form of phthisis induced by fevers, both continued and intermittent; yet the cases which he has adduced, chiefly from Lieutaud, are fever complicated with inflammation of the lungs and pleura, followed by tuberculous disease. But independently of such complications, it is often remarked that symptoms of phthisis occur towards the conclusion of fever, or during the succeeding convalescence.

When fever occurs in a person of a tuberculous constitution, it may prove the exciting cause of tuberculous deposits in the lungs, from the irritation to which these organs are exposed in all fevers; or if tubercles already exist in a latent state, (which we believe to be the most frequent case when fever is the exciting cause of phthisis,) it is very likely to call the tuberculous disease into activity. In this last case, the fever commonly goes through its usual course favourably: the febrile symptoms abate; the tongue becomes moist and clean; the skin soft, the various secretions natural; but there is still a slight return of fever towards evening, and the pulse is frequent at all times: yet the patient seems on the verge of convalescence, and the medical attendant expects to find the pulse slower at each visit, and generally predicts a speedy recovery. But he is disappointed: the frequency of the pulse continues; the evening accession of fever becomes more marked; there is a circumscribed flush on the cheek different from the general flush of fever; the cough which attended the latter in a slight degree increases; perspirations

\* Clinique Médicale, t. ii. p. 32.

occur towards morning; and the breathing is observed to be more rapid than during the severity of the fever. The real state of things now becomes evident. The fever has ceased, but in place of terminating in convalescence, as in a healthy subject, it is immediately succeeded by, or rather lapses into, hectic fever. The patient, already greatly reduced, becomes an easy victim to tuberculous disease of the lungs, and generally sinks rapidly under it: a few months, and in some cases a few weeks suffice to complete his destruction.

When the individual is merely predisposed to phthisis before the attack of fever, it is generally succeeded by a more perfect but lingering convalescence; the patient gains strength slowly; he is observed to cough occasionally; his pulse remains quick, and after some time a degree of hectic fever supervenes. These symptoms gradually increase, and at length evening fever and morning perspirations occur more regularly, and are soon followed by a train of symptoms which need not here be noticed. The disease in this case also proves speedily fatal.

There is a third class in which the fever appears connected with consumption, although this does not succeed so closely upon it. Months may elapse before the presence of phthisis is indicated by the usual symptoms, although the fever may still have been the determining cause; inasmuch as the patient never regained his wonted health after it. In this case the fever acts as a remote rather than an exciting cause of phthisis, and might more properly have come under remote causes.

The rapid progress of many cases of phthisis, apparently originating in fever, depends upon the existence of tuberculous disease in a latent state previously to the occurrence of the fever, during the convalescence from which symptoms of consumption were first observed. The irritation of the mucous membranes of the lungs and digestive organs which generally accompanies fevers, favours the increase of tuberculous disease already existing; and the state of convalescence is perhaps of all conditions the most favourable to the progress of pulmonary disease. In a subject exhausted and debilitated by an acute disorder, exposure to cold, over-fatigue, &c. may easily determine the production of phthisis.

Another circumstance which often occurs to aggravate and complicate the cases now under consideration, is an attack of pleurisy, pneumonia, or bronchitis, which is a frequent occurrence from imprudent exposure after febrile diseases.

There remains to be noticed a febrile affection peculiar to childhood, at least in its more acute form, which is fraught with the utmost danger, as it proves a frequent exciting cause of tuberculous disease; we allude to what is commonly denominated *Infantile Remittent Fever*. If neglected or improperly treated, it often induces fatal cerebral disease, but more frequently assumes a chronic form; and being essentially seated in the digestive organs, speedily leads to a derangement of the digestive

function and the various secretions connected with it, and moreover renders the child extremely liable to acute attacks of gastric and bronchial irritation, from slight errors in diet, exposure to cold, &c. This affection is considered by Hufeland as so intimately connected with tuberculous disease, that he regards it as a precursor of the scrofulous diathesis, or a sign of its presence, and proposes to name it scrofulous fever. According to his observation, it is most frequent within the two first years of life.\*

*Eruptive fevers*, particularly rubeola, scarlatina, and variola, are attended with still greater danger to persons of a tuberculous constitution than continued fever.

*Rubeola*.—Bronchial disease, often of a very severe character, forms an essential part of measles; so that we have bronchial irritation superadded to the fever. In early life measles are known to prove a frequent exciting cause of tuberculous disease.

*Scarlatina*.—Although attended with less bronchial irritation, scarlatina is still a very dangerous disease to young persons disposed to or labouring under the tuberculous diathesis. During convalescence from scarlatina there is a peculiar disposition to inflammation; and pleurisy and pneumonia are easily induced by slight exposure to cold, fatigue, &c., for some time after the eruption has ceased; and the rapidity of phthisis after scarlatina, which was noticed by Morton, is, we believe, chiefly owing to the inflammation of the pleura or lungs being superadded to the tuberculous disease previously existing. It is during the convalescence from these diseases that the great danger is to be apprehended, and the most sedulous care should be taken during that period to guard against exposure to cold and other exciting causes of pulmonary inflammation.

*Variola*.—Small-pox is generally accompanied with much bronchial irritation, and proves a very fatal disease in the strumous habit; but fortunately we have few opportunities of witnessing the evil consequences of this disease at present. The following remark of Heberden will shew that the influence of the diseases which have just been noticed, in inducing phthisis, did not escape the observation of that sagacious physician: "*Fieri potest ut morbilli graviore, vel peripneumonia, vel tussis convulsiva, vel alia adversa valetudo latentia tabis semina excitent, vel etiam gignant, tam in ultimâ senectute, quam in pueritiâ; cujus rei exempla ubique obvia sunt.*"†

Several other diseases have been considered causes of phthisis, such as *rheumatism*, *syphilis*, *psora*, &c.; but the observations upon which this opinion rests do not appear to us to have been made with sufficient accuracy to merit notice in this place.

SECT. XI.—OF THE PATHOLOGY OF PHTHISIS, AND OF TUBERCULOUS DISEASES IN GENERAL.

In a certain condition of the system which we have endeavoured to describe under the title of tuberculous cachexia, a peculiar mat-

\* *Traité de la Maladie Scrophuleuse*, p. 92.

† *Commentarii*.

ter is poured out by the bloodvessels and deposited in the various tissues and organs of the body. This matter, constituting one of the forms in which the morbid modification of the general system manifests itself, is subject to laws of formation and has physical characters proper to itself, by which it can generally be recognised, however modified in form and appearance by the structure or functions of the part in which it is deposited.

From remote antiquity to the present day, the disease of which this matter constitutes the distinctive anatomical character, has received different names according to its development in particular organs and tissues. In the external glands and in bones, it is commonly called *scrofula*; in the lungs, *phthisis*; and in the glands of the mesentery, *tabes mesenterica*, &c. The identity of these affections was only suspected by the ancients from the similarity of the general symptoms, but has been demonstrated by the moderns on the clear evidence of morbid anatomy; an increased attention to which science and the study of the causes of the disease has led pathologists to entertain more accurate opinions and more comprehensive views regarding it.

From the rounded form which this matter assumes in certain situations, it received the very inappropriate name of *tubercle*; a term which is still applied to it by modern pathologists, although it designates an appearance not constant to this but occasionally assumed by other morbid products, and depending rather on the structure of the organs in which it is deposited than on the matter itself; as is clearly shewn in Dr. Carswell's "Illustrations." It occurs perhaps more frequently than any other morbid product; and a proof that it is dependent on a certain morbid condition of the animal economy is to be found in the circumstance that it is often deposited at the same time in various parts of the body,—on some occasions in almost every organ.

Tubercle or tuberculous matter is now, we believe, generally considered as a secretion or deposit depending upon a morbid state of the general system, from the liability to which no constitution, no temperament, age, sex, or race, as we have already seen, is entirely exempt, though the disposition to it is strongest in that condition of the body called lymphatic in the age of infancy, in the female sex, and in the negro race. These and other circumstances of climate, occupation, &c., not only influence its absolute frequency, but have also a powerful effect in determining its development in particular organs or structures, in modifying the course of the disease, and in giving a various character even to the general diathesis by which the disposition to its formation is characterised.

But in whatever point of view we may regard tuberculous cachexia, we shall find its phenomena explicable only by admitting that it depends on a general modification of the whole and every part of the animal economy; and that all notions which regard it as the morbid degeneration of any organ or tissue, or of any particular system, or the morbid modifica-

tion of any single fluid, are necessarily erroneous, and founded on limited views of its nature and laws, and totally inadequate to explain its phenomena.

The deposition of the peculiar matter of tubercle in any of the tissues or organs of the body is only the result of previous changes in the general system, cognizable, as we have endeavoured to show (Sect. II.), by the physical condition of the patient and by a disordered state of various functions,—a condition of body quite distinct from mere debility, and therefore inexplicable on the idea of a difference of force or tone of the system; and which, though very generally accompanied with a feeble organisation, is not inconsistent with too great development and inordinate action of particular parts, and even with considerable physical power of the system.

As tuberculous cachexia appears to be the consequence of an imperfect assimilation of the nutritive matter received into the economy, it is evident that its influence cannot be confined to any part, tissue, or organ, but pervades the whole system, and modifies the entire organism,—the structure of every part and the nature of every secretion. Thus the osseous system is more spongy; the cellular tissue is singularly lax; the muscular flaccid and imperfectly developed; the vascular system is weak and irregular in its actions, and subject to local congestions from the slightest disturbing causes. The circulating fluids also partake of the general disorder; the blood is serous, and deficient in fibrine and colouring matter.\* The glandular and lymphatic systems are more peculiarly affected, as being more intimately concerned in the function of nutrition; and hence this system has been by many considered as the seat of the disease. The skin is generally thin and soft, or thick, coarse, and dry, and subject to many diseases apparently arising from the morbid condition of its function of secretion, which is always in tuberculous subjects more or less deranged. The mucous system is peculiarly susceptible of disease; and great discharges of matter, differing more or less from the healthy secretion, are poured forth from the surfaces of the mucous membranes on the application of the slightest causes of irritation or congestion. These we consider as examples and proofs of a defective state of organisation,—the consequence of defective power in the assimilative organs, or an imperfect supply of nutritious matter, &c. This view of the pathology of tuberculous cachexia is that, we believe, generally adopted by the best pathologists of the present day. But Dr. Todd has gone further, and explained his opinion by attributing the formation of tubercles to the deposition of coagulable lymph imperfectly organizable. From his experiments on the reproduction of the amputated members of the lower animals, he is induced to consider coagulable lymph as the matrix of the various tissues of the body.†

\* Andral, Anat. Path. Trans. vol. i. p. 535.

† See our work "On the Influence of Climate, &c." pp. 311-314, note.

In the healthy state of the nutritive function each part separates the materials proper for its support, and converts them into its own particular tissue or structure; and the various secretory organs secrete their peculiar fluids in their due quantity and healthy qualities,—some to be applied to the purposes of the animal economy, others to serve as vehicles for eliminating effete and useless matter from the system. Hence, imperfect assimilation on the one hand, or defective secretion and elimination on the other, may ultimately give rise to a state of tuberculous cachexia. Such a condition being once established in the parent, it is easy to conceive what will be its influence on the offspring.

The extended view which we take of tuberculous cachexia, and of its influence on the secretions and on the products of diseased action, inclines us to believe that tubercular deposits are always at first in a fluid or semi-fluid state, and that the concrete form in which they are commonly found arises simply from the absorption of the more fluid part, and is in many situations dependent even on their compression, as is shown by Dr. Carswell; and we have no difficulty in conceiving that the matter formed in certain cutaneous eruptions,—and that thrown off from the free surfaces of mucous membranes, would have assumed all the characters of crude tubercle, had it been confined in the parenchyma of organs, or the extreme bronchial ramifications, &c. When the tuberculous diathesis prevails to a great degree, large depositions of tuberculous matter may take place in many organs of the body about the same time; or irritation of any one organ may determine the production of the disease in that alone, and death may be the result, before other parts of the system are affected.

The foregoing observations, with some slight exceptions, are to be regarded rather as a detail of the more constant phenomena which accompany the progress and development of phthisis, than as an exposition of the real pathology of the disease. In the few remarks which we are now about to make, if we deviate from the sure path of demonstrable fact, we believe that we are still borne out by observation and by the results of practical experience; and we are willing to incur the imputation of yielding a little to theory rather than hazard the chance of leaving unsaid that which, we are disposed to think, may be of practical value to some of our readers.

It is reasonable to believe that the remote causes of phthisis, however variously they may appear to operate, do so by inducing some peculiar or determinate derangement of the system—some positive pathological condition, which, being constantly present wherever tuberculous disease is found, may be regarded as necessary to its production. Although we hesitate not to say, that, in the actual state of our physiological and pathological knowledge, we are unable to define with certainty all the conditions in which tuberculous disease has its origin; we think that it would not be difficult to point out some of the more im-

portant links of the chain which connect its special functional disorder with the formation of tuberculous cachexia. On some future occasion we may take an opportunity to enter more fully upon the subject; our limits at present merely permit us to call the attention of the reader to that morbid condition which, in our minds, constitutes the most obvious and important in a practical point of view.

A congestive state of the venous system of the abdomen is the condition to which we refer; it is one which was familiar to the pathologists and practitioners of the last century, and, although it has not been quite overlooked, it has been too much neglected by the moderns. Such of our readers as are familiar with the writings of the German physicians of the middle of the last century, particularly Stahl,\* Hoffman,† and above all Kaempf, and his disciples, will be aware of the extensive influence and importance attached to this state of the abdominal circulation, at that time. Referring to those works where the facts upon which the doctrine rests are fully exposed, we shall restrict ourselves here to a few observations more particularly bearing upon the subject of this article, and which it is but justice to ourselves to say were established in our mind as the result of practical observation, before we were aware of the existence of the German doctrines of abdominal infarctus.‡

In children originally of a strumous habit, we observe a constant disposition to this congestive state of the abdominal circulation; and unless we succeed in obviating it, they become tuberculous and die early in life. In youth we find the same state of congestion as a precursor of tuberculous cachexia; but it is during the middle period of life, from thirty-five to fifty, that it is accompanied with more marked symptoms, such as dyspepsia with its various concomitants, which exist often for a very considerable time, and not unfrequently obscure the pulmonary affection till tuberculous disease has made considerable progress. This is the form of the affection which has been denominated *dyspeptic phthisis*; and if

\* See his "*Vena Portæ, Porta Malorum*."

† Med. Rat. t. i. s. 1 cap. viii.

‡ John Kaempf, the original improver, if not author, of this doctrine of *abdominal infarctus*, and of its peculiar treatment by clysters, did not himself publish any work on the subject. The doctrine was first made known in the inaugural dissertation of his eldest son (also named John) *De infarctu vasorum ventriculi*, published at Basil in 1751. It was afterwards more fully developed in the dissertations of Koch, *De infarctibus vasorum in infimo ventre*, Argent. 1752; of Schmid, *De concretione uteri*, Basil, 1753; of Elvert, *De infarctibus venarum abdominalium*, Tubing. 1754; of Faber and Brothbeck, *Ulterior expositio novæ methodæ Kaempfianæ*, Tubing. 1755; of G. L. Kaempf (the second son), *De morbis ex atrophia*, Basil, 1756; and, finally, in the treatise published in his native language by John, the eldest son, entitled *Fur Aertse und Kranke bestimende ab hardlung*, &c. Dessau, 1784-8. The best of these dissertations, viz. those of J. Kaempf, Koch, Elvert, and Faber and Brothbeck, are reprinted in the third volume of *Baldinger's Sylloge*, Göt. 1778.



the term referred merely to the cause of the pulmonary disease, there would be little harm in retaining it,—but if used to designate a species of phthisis differing from the tubercular, we consider it decidedly objectionable; because, however prominent the dyspeptic symptoms may be, tubercular disease of the lungs is the cause of death. While we admit to the fullest extent the necessity of attention to the state of the digestive organs, we must object to the pathological view which limits the attention of the practitioner to the dyspeptic affection, neglecting other and equally essential parts of the treatment. We do not know such a disease as dyspeptic phthisis as constituting a particular species; but we are well acquainted with that form of tuberculous phthisis which is long preceded and accompanied in its progress by dyspepsia. Indeed, tubercular phthisis rarely occurs in the middle period of life without this complication; but it cannot be doubted that the deranged condition of the digestive organs is, in these cases, very often a mere consequence of a long pre-existing state of congestion of the venous system of the abdomen; and which, if not corrected by more efficient measures than those generally applied to relieve the dyspeptic symptoms, may soon terminate in pulmonary consumption. The profession are highly indebted to Dr. Wilson Philip for calling their attention to the congestive state of the hepatic system, and pointing out some of the most effectual means of obviating it; but we cannot admit that his dyspeptic phthisis differs in its nature from common tubercular phthisis.

The effects of congestion and derangement of the abdominal viscera have long been remarked as causes of phthisis: they were regarded by Kaempfer and his disciples as giving rise to most of the chronic diseases of the chest. Portal observes that it is certain that engorgement of the liver and other affections which derange the secretion and even excretion of the bile, may become a cause of pulmonary phthisis; and several other authors have remarked the connexion of phthisis with abdominal disease, but in a manner so vague and undefined as to attract little attention.

Abdominal plethora, when once established, gives rise to a series of deranged functions in the digestive organs, the lungs, skin, &c., which, by impeding digestion and assimilation, affect the whole animal economy. These are manifested in imperfect biliary secretion, constipated bowels, and irritated mucous surfaces, in congestion of the lungs, and a dry and harsh state of the skin. In consequence of the overloaded condition of the venous system, the heart, generally feeble in the tuberculous constitution, is oppressed, and the arterial circulation impeded and enfeebled. In this state of the system, very slight exciting causes induce disease, especially inflammation and hemorrhage; hence arises the constant liability of strumous subjects to inflammatory diseases of a sub-acute and chronic character, and hence also we derive an ex-

planation of the hemorrhages to which they are peculiarly liable even at a very early age. The same pathological state of the abdominal circulation forms the remote cause of the various congestive and chronic diseases so common in the strumous subject; such as glandular swellings, cutaneous eruptions, &c. &c.

#### SECT. XII.—PREVENTION OF TUBERCULOUS DISEASES.

We have stated our views so fully respecting the nature and causes of tuberculous diseases, that it is unnecessary to enter into minute details on the subject of prevention: we shall, therefore, confine ourselves to some general remarks regarding the principal circumstances which require the attention of the physician who may be called upon to lay down rules respecting this most important subject.

The first question that suggests itself under the head of prevention regards Hereditary Transmission, and involves the consideration of two distinct objects;—the first being to check the transmission of the disease by the parent to the offspring; the second, to prevent the disease in children born with the constitutional predisposition to it.

##### 1.—*Prevention as regards Parents.*

We have already endeavoured to show in the section on the Causes of Phthisis, that it is not necessary that the parents should be the subjects of tuberculous disease in order to transmit the tuberculous constitution to their children:—the belief that scrofulous parents only have consumptive children is an error that cannot be too soon corrected. We have also shown that a deranged state of health in the parent from many different causes, may render the offspring predisposed to the disease before us.

Every member of the profession, by observing what is daily passing before him, may see numerous proofs of the truth of this statement: he will find that when the parents are unhealthy, the children are so likewise, and that the latter often show evident signs of the tuberculous constitution when the former have no symptoms of it. The children of parents who have suffered long from dyspeptic complaints, gout, cutaneous affections, or any other form of disease which has influenced the general system, are very frequently the subjects of tuberculous disease, or of such derangements as dispose to tuberculous cachexia. When both parents are affected, this result is brought about with more certainty.

*Marriage.*—In order to prevent effectually the extension of tuberculous disease, it is essential that we should in the first place direct our attention to the health of the parents:—were they convinced that the health of their children depended upon their own, a beneficial effect might be produced among the more reflecting part of mankind, and especially among families of a strumous habit. If more consideration were bestowed on matrimonial alliances, and a more healthy and natural mode of living were adopted by persons in that rank of life which gives them the power of regulating their mode of living

according to their own choice, the predisposition which is so often entailed on their offspring might be checked, and even extinguished in their family, in the course of a few generations. In the present state of society, the reverse of this very commonly happens; and from the total disregard of the precautions alluded to, the third generation often terminates the race. The children of dyspeptic persons generally become the subjects of dyspepsia in a greater degree and at an earlier period than their parents; and if they marry into families of a delicate constitution, their offspring become highly tuberculous and die of phthisis in early youth or even in childhood. We could at this moment adduce many examples of this melancholy fact; but it is consolatory to know that it is an evil which may be in some measure obviated or removed. This extinction of families may, we believe, be prevented by judicious intermarriages with healthy persons. Families already predisposed to tuberculous disease should at least endeavour to avoid matrimonial alliance with others in the same condition; but above all they should avoid the too common practice of intermarrying among their own immediate relations,—a practice which is at once a fertile source of scrofula, a sure mode of deteriorating the intellectual and physical powers, and eventually the means of extinguishing the degenerated race. "There can be no question," says Dr. Mason Good, "that inter-marriages, among the collateral branches of the same family, tend more than any thing else to fix and multiply, and aggravate hereditary predisposition. And hence, nothing can be wiser, on physical as well as on moral grounds, than the restraints which divine and human laws have concurred in laying on marriages between relations."\* It would also be well if all persons who contemplate marriage were aware of the necessity of attending to their state of health previously to, and after the adoption of this change of life. The dyspeptic should have recourse to those means which are calculated to restore the functions of his digestive organs; the gouty subject should renounce the well-known causes of his disorder; and those who are afflicted with organic disease, more especially with consumption, should pause before they enter into a contract which can only entail disease and unhappiness on all concerned.

The medical practitioner alone sees, or at least comprehends the extent of misery originating in marriages of this description; he will, therefore, appreciate the justness of these remarks, although he will acknowledge the difficulty of enforcing them on the practical consideration of the public. We are well aware that the mass of mankind are far too reckless to attend to any precautionary measures on the subject, even though perfectly satisfied of their truth and necessity; still there is a small proportion on whom we are inclined to think these cautions may not be wholly thrown away. It must not be forgotten that

this is not merely a question which has reference to private feelings and social happiness, but one of great public importance, involving at once the well-being of society, and the moral as well as the physical character of nations.\*

*Pregnancy.*—There are certain rules of management and conduct which it is necessary for every Mother to pursue during pregnancy. Far too little regard is paid by females to their health during this most important period of their lives, and they are in general little aware of the influence of their own health upon that of their children. From the commencement of pregnancy, every female, especially if she is delicate or belongs to a strumous family, should regard her health with more than common solicitude. She should take daily exercise in the open air suited to her strength, and when circumstances permit, we would recommend that she should pass the period of pregnancy in the country.

It has often been imagined that females during the state of pregnancy require a fuller diet than that to which they have been previously accustomed. This is a great error as a general rule: increase of diet is not necessary or beneficial; on the contrary, it is often useful to reduce the usual quantity of food, especially in the advanced months, a period during which stimulants of all kinds are generally hurtful. There is an increased activity in the system of the pregnant female, which, so far from requiring any additional increase from art, more frequently renders it necessary to diminish the stimulants in common use.

Crowded assemblies of all kinds, public spectacles and theatrical exhibitions, in short every thing calculated to excite strong feelings, to depress the mind, or excite the passions, ought to be sedulously avoided. There are numerous other circumstances regarding the conduct of females during pregnancy which do not come within the province of this article: these it will be the duty of the medical attendant to point out and enforce. He should particularly impress upon the attention of the young mother, that the health of her infant depends upon her own, and that from the commencement of pregnancy she is to consider herself responsible in a great degree for the health of her offspring.

## II.—*Prevention as regards Children.*

Although we are not acquainted with any direct remedies for the constitutional predisposition to tuberculous disease, there can, we think, be no doubt that we are possessed of the means of correcting it in many instances in an indirect manner.

By placing the predisposed child in circumstances the most favourable to health, as regards nourishment, air, exercise, &c.; by removing functional derangements as they occur, and by maintaining especially a healthy condition of the digestive organs, we may improve the constitution so as to overcome the hereditary pre-

\* We beg to refer to the valuable little work of Mr. Belinaye, on the "Sources of Health and Disease in Communities," for some very judicious remarks on this subject.

\* Study of Medicine, vol. v. p. 35.

disposition. By the measures now referred to, we are persuaded that a large proportion of such children might be saved, although it is perhaps not beyond the truth to say that five-sixths perish under the present system of management. In proceeding to develop more fully the measures which we deem essential in the accomplishment of this object, we are well aware that many of our recommendations will unfortunately be beyond the means and attainment of the public at large; but nevertheless we feel called upon to state them without regard to individual exceptions, as they are in our opinion the most effectual means of prevention when circumstances admit their application.

In order to render our observations more practical, we shall apply them to the different periods of life: this will, no doubt, give rise to some repetitions; but these are unavoidable in treating of a disease the causes and remedies of which vary so much at different ages.

1. *Prevention of the disease in Infants.*—During the growth and development of the body, all those measures which are known to contribute to the general health must be adopted, in order to prevent tuberculous disease in an infant born with the predisposition to it. The rules for governing the health of strumous infants are nearly the same as for others; but they require to be more rigidly enforced and more strictly attended to. Unless the child of tuberculous parents be reared with the greatest attention to every circumstance which can contribute to health, he has but little chance of reaching maturity without becoming the subject of tuberculous disease.

*Nursing.*—If the infant derives the strumous constitution from both parents, or from the mother only, he should be suckled by a young healthy nurse; but should the disposition to disease be derived entirely from the father, and the mother's health be unexceptionable, she should suckle her own child. It is always satisfactory when this can be accomplished, as it is, with few exceptions, the plan most agreeable to the mother; and if her mode of living be consistent with her duties as a nurse, it will be far better for the infant: but all these contingencies require consideration before we decide on the plan which it is desirable to adopt. We do not enter upon the moral consideration of the question,—we merely speak of it in a medical point of view; and we are satisfied that when the mother's health renders her unfit to nurse her child, or her habits or mode of living are such as to prevent her from adhering to those regulations by which every nurse, whether mother or not, should abide, it is much better for the health of the infant that he should derive his first nourishment from the breast of a stranger.

The arguments advanced in favour of the opinion that every mother should nurse her own infant, appear very plausible, and would be perfectly just if every mother enjoyed that state of health which renders her fit for such a duty. In the present state of society, however, this is far from being the case, and we

therefore consider it better for the delicate mother herself, and infinitely so for her child, that she should at once renounce a task for which her constitution renders her unfit, than struggle on for a few months in an attempt which may injure her own health and destroy her infant. Half measures, so often recommended in such cases, are always unwise; they generally end in the child being fed by hand in place of being suckled,—a plan which never fails to injure the health of a strumous infant. We would therefore lay it down as an invariable rule, that the child of a consumptive mother or of one in whom the strumous constitution is strongly marked, more particularly if it be attended by decided scrofulous disease, should be suckled by another woman, and that the period of nursing should generally range from twelve to eighteen months, or even longer. We recommend the suckling to be continued for this length of time, partly with a view to enable the infant to pass over the dangerous process of teething with greater safety: indeed the strumous infant should not be weaned till the first set of teeth have appeared; he should have no food in general but the nurse's milk till he is six months old at least, and for some time after this it should be of the lightest quality, and constitute a small proportion of his nutriment.

It is almost unnecessary to add to these remarks that the selection of a nurse for a tuberculous infant deserves especial attention. She should be young, healthy, and free from all suspicion of a strumous constitution, and her child should not be older than that which she is required to nurse. She should take daily exercise in the open air; her regimen should not differ much from that to which she has been accustomed, and any change which is made in it should be gradual. It is erroneous to suppose that women when nursing require to be much more highly fed than at other times: a good nurse does not need this, and a bad one will not be much better for it. The quantity which many nurses eat and drink, and the indolent life which they too often lead, have the effect of deranging the digestive organs, and frequently induce a state of febrile excitement, or a premature return of the catamenia.

*Dress, Bathing, &c.*—The dress of all infants should be carefully suited to the season. The whole surface, particularly the extremities, should be well protected during cold weather: the notion that infants may be hardened by exposing them to the air in a half-covered state is false in the case of all children, and leads to pernicious consequences in those of a delicate constitution.

Much has been said and written in favour of cold bathing; and authors who have laid down rules on this subject have adduced in support of the practice the customs of savage nations, altogether overlooking the difference in the condition of infants in civilised life. The object of washing and bathing children is two-fold; the first and most important being that of cleanliness, especially in the tuberculous infant, in whom it is essential that the cutaneous functions should

be maintained in a state of healthy activity. At first the infant should be washed with warm water, and a bath every night, with the view of thoroughly cleaning the body, will be beneficial; by degrees the water with which he is sponged in the morning may be made tepid, but the night bath should be continued of such a temperature as to prove grateful to his feelings. The second object in bathing being to brace and strengthen the infant, he may, as his age increases, be sponged with cold water, or even plunged into it, every morning during the summer with advantage. The judicious adoption of this plan, along with subsequent friction of the body with flannel, is, we believe, one of the most effectual means of strengthening children; but its effects must be carefully watched, as all children will not be equally benefited by cold bathing, and the health of some may even be injured by it.

*Air.*—As we regard the respiration of a deteriorated atmosphere one of the most powerful causes of tuberculous cachexia, so we consider the respiration of pure air an indispensable requisite for strumous children; indeed, without this all our efforts to improve their health will fail. Too much attention, therefore, cannot be paid to the construction and ventilation of the child's apartments: the room in which he sleeps should be large and well-proportioned, the air should be frequently renewed, and his bed should not have more curtains than are necessary to guard against currents of air. The custom which prevails in this country of surrounding beds with thick curtains is most injurious to health; and it is to this habit, and to the heated atmosphere of their bed-rooms, that the languor and bloated appearance of many young persons, on first awaking in the morning, is in a great measure to be attributed. The bed-rooms should be large in all their dimensions, they should be in an elevated part of the house, and so situated as to admit a free supply both of air and light: those apartments to which the sun's rays and the refreshing breeze have free access, are always the most healthy and desirable.

The proper time for carrying an infant into the open air must be determined by the season of the year and the state of the weather. A delicate infant born late in the autumn will not generally derive advantage from being carried into the open air, in this climate, till the succeeding spring; and if the rooms in which he is kept are large, often changed and well ventilated, he will not suffer from the confinement, while he will most probably escape catarrhal affections which are so often the consequences of the injudicious exposure of infants to a cold or humid atmosphere.

*Residence.*—It is almost unnecessary to say, that when an infant can be suckled in a healthy situation in the country, it is, *ceteris paribus*, far preferable to the town; but the choice of situation requires so much judgment and is so little regarded, that we trust to be excused for offering a few remarks in this place on the rules by which it should be regulated.

There is no circumstance connected with health, concerning which the public are, in our opinion, so ill informed, as the requisites of a healthy residence, both as regards the local position and the internal construction. In this island we have chiefly to guard against humidity, on which account our houses should not be built near water, especially when stagnant, and, still less, near marshes.

Large trees, which are both an ornament and an advantage at some distance from a house, become injurious when so near as to overshadow it, or prevent the air from circulating freely around it, and through its various apartments. The atmosphere of a building overhung by trees, or surrounded by a thick shrubbery, is in a state of constant humidity, except in the driest weather; and the health of the inmates rarely fails to suffer. The natural moisture of the country arising from the humid state of the soil and vegetation, is greatly increased by such an injudicious mode of planting; an artificial atmosphere is thus created which renders a situation of this kind much less healthy than the more open parts of large towns. It is not generally known how limited may be the range of a damp unhealthy atmosphere; a low situation surrounded by trees may be capable of inducing tuberculous disease in an infant, whereas a rising ground a hundred yards distant may afford a healthy site for his residence. The dryness of the air in towns, which is the consequence of good drainage and an artificial soil, is at once the safeguard of the inhabitants, and a compensation, in some measure, for the want of that unimpeded circulation and renewal of pure air which the country alone affords.

2. *Prevention of the disease in Childhood.*—During the period of childhood the same unremitting attention is necessary to the circumstances just mentioned under the head of infancy. The important process of teething being fairly passed, the food of the child ought to be regulated chiefly by the state of the digestive organs. In proportion to the delicacy of the child, the diet will in general require to be mild; when he thrives upon farinaceous food, milk, and light broths, no stronger or more substantial diet need be used during the first two years of life:—when he looks healthy, and grows, and his bowels are regular (for this is one of the surest indications that the food is suited to the digestive organs,) we have the best proofs that the diet agrees with him. When, on the other hand, the child appears heated or flushed towards evening, when he drinks greedily and more than is usual in children of the same age, and when his bowels do not act regularly, we may be assured that there is something wrong in the regimen employed.

There is no greater error in the management of children than that of giving them animal diet very early in life. To feed an infant with animal food before it has teeth proper for masticating it, shows a total disregard to the plain indications of nature in withholding such teeth

till the system requires their assistance in masticating solid food. Before that period, milk, farinaceous food, and broth afford that kind of sustenance which is best suited to the digestive organs, and to the nourishment of the system. The method of grating and pounding meat as a substitute for chewing, may be well suited to the toothless octogenarian, whose stomach is capable of digesting it; but the stomach of the young child is not adapted to the digestion of such food, and will be disordered by it. When the child has the means of masticating, a little animal food may be allowed; but at first it should be of the lightest quality and given on alternate days only, and even then its effects should be watched; for all changes in the regimen of children should be gradual.

The frequent origin of scrofulous disease in defective nourishment has led to the opposite extreme; and children who are disposed to tuberculous disease are too often subjected to a system of overfeeding, which induces the disease it is intended to prevent. By persevering in the use of an overstimulating diet the digestive organs become irritated, and the various secretions immediately connected with digestion are diminished, especially the biliary secretion; at least the sensible qualities of the bile enable us to observe it best. Constipation of the bowels soon follows, congestion of the hepatic and abdominal veins succeeds, and is followed by the train of consequences which have already been detailed. It would be well if the advocates of the system of high-feeding would bear in mind the salutary adage, *corpora impura quo plus nutries, eo magis lœdis*.

**Exercise.**—When the child has acquired sufficient strength to take active exercise, he can scarcely be too much in the open air; the more he is habituated to this, the more capable will he be of bearing the vicissitudes of the climate. If children are allowed to amuse themselves at pleasure, they will generally take that kind and degree of exercise which is best calculated to promote the growth and development of the body. When they are too feeble to take sufficient exercise on foot, riding on a donkey or pony forms the best substitute: this kind of exercise is at all times of infinite service to delicate children; it amuses the mind and exercises the muscles of the whole body, and yet in so gentle a manner as to induce little fatigue. Young girls should be allowed, and even encouraged to take the same kind of exercise: it is chiefly the unrestrained freedom of active play that renders boys so much less subject to curvatures of the spine and other deformities than girls,—a large proportion of whom are more or less mishapen, in consequence of the unnatural restraint which is imposed upon them in their exercise and dress.

**The clothing** of young persons requires particular attention, and must of course be regulated according to the season. The winter dress should be early resumed and laid aside late. It is in spring and autumn that the vicissitudes of our climate are greatest, and congestive and inflammatory affections most com-

mon: this is peculiarly the case in the spring, which is also the season when local strumous affections are most liable to occur in constitutions disposed to them. Flannel next the skin is in our opinion not only proper but generally necessary: it may be put off with advantage during the night, and cotton may be substituted during the summer, the flannel being resumed early in the autumn.

**Education.**—The education of strumous children requires much judgment and consideration; no such child should be condemned to pass the greater part of the day in the close apartments of a crowded school until he has attained his ninth year at least.

We consider that the hours of confinement in schools are much too long for the purposes of instruction, and might be abridged with great advantage to the health of the children; the young mind is easily wearied, and it is not sufficiently considered that the intellectual development ought for a time to give way to the physical improvement of delicate children. School-rooms should be large and lofty, so as to insure ventilation without the risk of exposure to currents of cold air, for the impure atmosphere which too commonly prevails in schools is an unfailing source of injury to health. During the first years of education, children should be allowed a little relaxation and play at intervals in the school hours.

At no period of youth should education be pushed beyond its proper limits or the mind be worked above its powers; the welfare of the pupil demands the observance of this rule on the part of the master as well as the parents, more especially when the child belongs to that class of strumous children whose intellects are preternaturally acute. Unfortunately, however, these are generally the pupils selected by the master to do credit to his establishment; every means are taken to encourage the premature manifestation of mind and to stimulate the child to renewed exertions; and thus health, and even life, is often sacrificed at a period of brilliant promise, when the hopes of friends are buoyed up by the fallacious expectation of a harvest which a more rational system of education might have realized.

In some cases, however, the mischief resulting from this cause does not make its appearance at this early age; we have met with many distressing examples of young men, who, after years of close application at school, had entered upon their studies at the university with the same unabated zeal, but were soon compelled by the sudden failure of their health to abandon their literary pursuits and the prospects which they had in view. The more we have seen of the prevailing system of management in schools, the more have we been persuaded that no subject more deserves the attention of parents than the education of strumous children; and, however laudable may be their desire to see the minds of their offspring highly cultivated, it should be checked by the knowledge that this object can only be attained by the sacrifice of health, and too often by the loss of life. "The

time," says Dr. Beddoes, "is not perhaps far distant, when parents shall discover that the best method of cultivating the understanding, provides at the same time most effectually for robustness of constitution; and that the means of securing both parts of the comprehensive prayer of the satirist,—*ut sit mens sana in corpore sano*—are identical."

The consequences which we have just noticed as arising from the erroneous system of education in the schools for boys, prevail in a greater degree, and are productive of more injury in female boarding-schools. If the plans pursued at many of these establishments were intended to injure the health of the pupils, they could not be better contrived to effect that purpose. The prevailing system of female education is indeed fraught with most pernicious consequences:—at a period of life when the development of the physical constitution demands the most judicious management, young girls are sent to schools in which no other object appears to claim consideration than the amount of mental improvement, or rather the variety of accomplishments with which they can be stored. At an early hour in the morning the pupil is set down at the piano or the drawing-table, where she remains in a constrained position, often in a cold room, till the whole frame, and more especially the lower extremities, become chilled:—the brief relaxation during the short space allowed for meals and the formal walk, are insufficient to restore the natural warmth of the system; and it often happens that girls are allowed to retire to their room at bedtime with their feet so chilled as frequently to prevent sleep for hours. Those who are acquainted with the boarding-schools of this country will allow that this is no exaggerated picture of many of them. A delicate girl submitted to such a regimen cannot escape disease.

While school-boys have the advantage of a play-ground, or enjoy their recreation at pleasure in the open fields, the unfortunate inmates of a female boarding-school are only permitted to walk along the footpaths in pairs in stiff and monotonous formality, resembling, as Beddoes justly remarks, a funeral procession, and wanting nothing to funeral melancholy but sables and the hearse. The consequence is, that the muscles of the upper extremities and those which are chiefly concerned in the support of the trunk are rarely called into active play; they do not acquire strength as the body increases in stature; they remain weak and unequal to the task of supporting the trunk in the erect posture. A curved state of the spine is generally the consequence; and this, by altering the position and form of the thorax, renders the respiratory movements imperfect; the capacity of the chest is diminished, and the lungs are consequently more liable to congestion, and the diseases which are its consequences.

While the natural form of the body is thus destroyed, the derangement of the general health is manifested by the paleness of the countenance, the dry and coarse appearance of the skin, costive bowels, and cold extremities. In

short, all the requisites for the production of struma may be found in a large proportion of female boarding-schools, where the system we have described is pursued.

There are many exceptions to this system of boarding-school education, and the number would no doubt be considerably increased if the conductors of such schools were aware of half the misery they inflict on the young committed to their charge. In the establishments to which we allude, as being conducted on different principles, the cultivation of the mind and the acquirement of the various female accomplishments are not the only objects of pursuit; the health of the girls forms, as it ought, the first and paramount consideration.

The time devoted to study by the present system should be greatly abridged, and that allowed for exercise augmented in proportion. The situation and construction of the school should be free from all the objections which we have already pointed out, and the exercise should be such as to call into action every muscle of the body in succession. The clothing during the winter must be warm, and every means should be adopted to guard against coldness of the extremities. The pupils should not be allowed to sit so long at one time as to induce this state, nor to go to bed with chilled feet. Were we to select any one circumstance more injurious than another to the health of young girls, it would be cold extremities, the consequence of want of active exercise and the prevailing and most pernicious habit of wearing thin shoes while in the house. A warm bath should form a necessary appendage to every boarding-school, and every girl should enjoy the benefit of it occasionally. A large, lofty, and well-ventilated room should be set apart for the express purpose of exercise, when the weather is such as to prevent it in the open air. We believe that a system of gymnastics is quite as necessary in the schools for girls as they are in those for boys; and, although they need not be carried so far as in the latter, they should be sufficiently varied to give free exercise to the trunk and arms, so as to expand the chest and strengthen the back. If the girl has any tendency to curvature of the spine, those exercises which are employed to cure this deformity should constitute a part of the daily gymnastics. To the room devoted to these exercises, the younger girls should be allowed to retire for a short time during the usual hours of school and amuse themselves at pleasure. This latter recreation we consider of the utmost importance: it must nevertheless be understood that no exercise is to be considered a substitute for that which is enjoyed in the open air; and for this reason every female boarding-school ought to have a play-ground, where the pupils may choose their own amusements and play without restraint.

It is almost unnecessary for us to observe that all tight-dressing is utterly incompatible with the extent and variety of exercise which we recommend, and must therefore be discarded. The idea that young females require stays as a means of support is admitted by all

medical men to be most erroneous, and only tends to perpetuate a practice which is productive of much evil and frequent deformity; especially at that unfortunate era, when, as Dr. Beddoes remarks, "the girl is taken up to be manufactured into a lady." If girls were properly exercised in the open air, and strengthened by the various means which are within the reach of all, and which nature points out to us as best, stays would not be necessary before the body is fully matured, and would even then be scarcely wanted.

The measures which we have suggested appear to us to be practicable, and could not fail to be productive of much good. We believe that if a judicious system of management were pursued in every boarding-school, the opprobrium which has so long attached to them would not only be removed, but they might be made the means of improving the general health of the pupils, and even of correcting the scrofulous constitution, and would thus become the source of much future happiness both to the children and their parents.

When we take a comprehensive retrospect of the nature and causes of consumption, the claim of this subject to our best attention will be fully apparent; and in urging it on the consideration of the profession, we would remind them that the most important object of physical education in this country, as Beddoes justly remarks, unquestionably is to guard against all tendency to consumption; and that it is only through their exertions that the desired improvements can be effected.\*

Before we conclude these remarks on the education of youth, we would advert to the great and paramount importance of the choice of a profession. There may be some advantages, as our great moralist contends, in fixing a young person, from the first dawn of thought, in a determination to some state of life; but we consider that it is far more essential that the parent should pause in selecting a profession for his son before he has fully ascertained that his health and physical capacity are sufficient to sustain the duties inseparable from it. So little is this now considered, that the most unhappy results are very frequently produced by the ill-judged selection of professions without any regard to health.

3. *Prevention of the disease in Youth.*—The period of life which extends from youth to adult age, from about the eighteenth to the twenty-fifth year in males, and the sixteenth to the twenty-second in females, is one of great importance as regards persons predisposed to phthisis. If their health has suffered by mismanagement in education, or from other causes, during early youth, the system very often begins to show it about the period of puberty

in a remarkable manner. The development of the body which should naturally take place at this epoch, and which in healthy persons is accompanied with an increase of strength and vigour in the system, is often delayed in such persons beyond the usual age, or imperfectly accomplished. If, therefore, they remain weak and thin, or look unhealthy after the period of puberty, they are in great danger of falling into tuberculous cachexia; this more especially happens in young persons who have been hard-worked at school, or kept much at sedentary occupations.

Under these circumstances, the utmost care will be necessary to prevent tuberculous disease. A strict inquiry should be made into the state of every function, and more especially of those connected with nutrition. The condition of the digestive organs and skin requires especial attention, because they are most commonly deranged: the tongue will very often be found furred; the alvine evacuations irregular; and the skin dry, harsh, and affected with eruptions, particularly with *acne* in its various forms:—in young females the catamenia will be found either to be imperfectly established, or not to have appeared. Such are the common symptoms presented to us in these cases, but they admit of considerable variety in different constitutions and temperaments.

The absolute necessity of attending to these early indications of tuberculous cachexia cannot be too strongly impressed by medical men upon the consideration of parents, in order to save the young persons to whom we allude. We have no doubt that a very large proportion of our youth who fall victims to phthisis from twenty to thirty years of age, might be saved by a timely adoption of the simple measures which we shall presently point out, and which are, in some degree, within the power and reach of all.

In the constitutions to which we allude, the pulse is generally feeble; the veins are largely developed; and the change in the balance between the arterial and venous circulation, which in others occurs only after the middle period of life, takes place in such persons before they have reached maturity, and hence we derive an explanation of many of their diseases. The chief object in our preventive treatment ought to be the maintenance of a healthy condition of the chylipoietic system, and an active state of the pulmonary and cutaneous functions; for which purpose very simple and available remedies are found beneficial: combined with these, warm bathing, frequent friction of the surface, exercise in the open air, and above all on horseback, along with a residence in a healthy part of the country, will often in a few months produce the most beneficial effects.

There is one kind of exercise which has not been sufficiently attended to in the prevention of pulmonary disease, but which deserves particular notice in this place; we mean the *exercise of the respiratory organs* themselves and of all the muscles employed in the pro-

\* We would strongly recommend the careful perusal of Dr. Andrew Combe's excellent work on "The Principles of Physiology applied to the Preservation of Health, and to the improvement of Physical and Mental Education." It is far superior to any work of the kind that we have met with;—it ought to be familiar to every schoolmaster and schoolmistress, and cannot be too generally read.

cess of respiration:—the great object of this is to expand the chest and ensure the full action of the lungs.

Dr. Autenrieth, of Tübingen, according to Sir Alexander Crichton, first recommended the practice of improving the narrow and contracted chest by deep and frequent inspirations. He advised his patients to place their hands upon some solid support, and to exercise themselves by taking repeated deep inspirations; but cautioned them against carrying this so far as to produce pain.\* We are in the habit of recommending the full expansion of the chest in a manner somewhat different from that of Autenrieth; we desire the young person while standing to throw his arms and shoulders back, and while in this position, to inhale slowly as much air as he can, and repeat this exercise at short intervals several times in succession: when this can be done in the open air, it is most desirable, a double advantage being thus obtained from the practice. Some exercise of this kind should be adopted daily by all young persons, more especially by those whose chests are narrow or deformed, and should be slowly and gradually increased. Fencing, the use of dumbbells, and similar modes of exercising the arms, will also be eminently useful in attaining the important end we have in view; but they should never be carried so far as to induce fatigue or uneasiness. If regularly employed by boys under this necessary restriction, they would not merely expand the chest, but would tend to remove that disproportionate development of their upper and lower extremities which we so frequently observe in youth. By thus exercising the upper extremities and the muscles of the trunk, and inflating the lungs to their full extent, the chest and pulmonary organs will acquire their due proportions. We also consider exercises of this description particularly necessary to persons engaged in occupations which require a bent or stooping posture; and especially to those mechanics, as tailors and shoemakers, whose constrained position seldom allows the upper parts of the lungs to be fully expanded.

Reading aloud and public recitation will also, when prudently employed, be useful in strengthening the pulmonary and digestive organs, and in giving tone and power to the voice. The clear and distinct enunciation which is acquired only by long practice, is seldom found associated with pulmonary disease, and we are therefore inclined to commend the practice of recitation and elocution at schools. It would, we believe, be difficult to cite the example of any great orator who died of pulmonary disease, while many might be adduced whose health was improved and their life prolonged by the beneficial effects of this exercise. Cicero was disposed to phthisis in early life, and Cuvier attributed his exemption from pulmonary disease, to which he was expected to fall a sacrifice, to the increased strength which

his lungs acquired in the discharge of his duties as a public lecturer.

Many of the modes of exercising the pulmonary organs which we have just described will be equally useful to young females, although they will not require to be carried to so great an extent. We consider the ancient and well-known game of battle-door and shuttlecock one of the very best exercises which can be adopted by them within doors.

Although we so highly approve of every judicious means of exercise, we would strongly condemn those which require excessive bodily exertion, such as climbing precipices, &c. and which have been sometimes recommended for the prevention of phthisis. These violent measures undoubtedly exercise the lungs, but they at the same time excite the action of the heart, and render it liable to be oppressed by the blood being suddenly forced upon it by the inordinate muscular exertion. We consider all such violent exertion fraught with danger: indeed we have met with several cases of diseased heart in young persons, apparently originating in forcible and long-continued exertion, as in boat-rowing, &c.

Of course, all these modes of exercise are quite incompatible with the existence of organic disease; it will therefore be incumbent on the medical attendant to ascertain the actual condition of the lungs before he recommends the adoption of any measures which would tend to aggravate the disease of which those now proposed are merely preventives.

There are also other rules relating to this important period of life which the medical attendant will not fail to keep in mind in laying down directions for his patient; but these are so obvious that it is unnecessary for us to enter on them here.

*Remedial measures.*—We have already seen that it is about the period of puberty that phthisis so often occurs and tuberculous cachexia is established; this, therefore, will be the proper place to consider the utility of those remedies which have been adopted for the cure of this morbid state of the constitution and for the prevention of phthisis. The utility, however, of these remedies is not confined to this period of life; they may be employed at any age, almost from infancy, when the circumstances of the patient indicate their use; and some of them, although ranked among preventives, are often applicable in the early stages of phthisis.

1. *Alteratives.*—We first notice this important class of remedies, both on account of their very general employment, and their beneficial effect on the health.

The remedies which we shall notice under this head are Mercury, Taraxacum, Sarsaparilla, Antimony, Sulphur, Mineral Waters, Alkalies, Lime-water, and the Muricates of Lime and of Barytes.

*Mercury.*—The influence of this medicine on the secreting functions of the liver renders it, when properly administered, a very valuable remedy in the tuberculous constitution; but if, on the other hand, it be carried beyond its alterative effect on the hepatic system, it seldom

\* Crichton, op. cit. p. 137.



fails to prove injurious; it requires, therefore, to be administered with great caution to persons of a tuberculous constitution. We give the preference to its milder preparations, such as the *hydrargyrum cum cretâ*: this, or the *pilula hydrargyri* given in such doses and at such intervals as shall prevent its producing irritation of the mucous surfaces of the alimentary canal, and followed by the employment of some gentle laxative, will be very useful in all those cases in which an imperfect biliary secretion and a torpid state of the bowels are prominent symptoms. It is usually, and we think very properly, prescribed in combination with some narcotic medicine, such as *hyoscyamus* or *conium*; and in our opinion it should always be followed by an aperient. Dr. Wilson Philip has recommended mercurial alteratives in small doses for the cure of hepatic congestion in a species of phthisis which he considers to originate in dyspepsia. We have already stated our opinion on this form of disease, but entertain no doubt of the existence of the hepatic congestion as a precursor of tuberculous disease of the lungs. In such cases a judicious employment of mercurial alteratives with aperients, and a well-regulated diet, may relieve the abdominal plethora, and thus remove congestion of the lungs. Although we cannot adopt Dr. Philip's views respecting the mode in which hepatic disease is communicated to the lungs, we agree with him that minute alterative doses of mercury, if used with judgment and discretion, may often produce the most salutary effects in threatened or incipient phthisis.\* Beyond this stage the practice can only be palliative; although it may afford relief, it cannot cure tuberculous disease of the lungs, and unless employed with much discretion may be productive of mischief.

*Taraxacum*.—We consider this a very valuable medicine in tuberculous constitutions, from its power of diminishing abdominal plethora, and its especial influence on the urinary and biliary secretions. Hufeland strongly recommends taraxacum every spring in the treatment of scrofula, and the translator of his work regards it as an efficacious remedy in the mesenteric disease of infants, and in the congestions of the abdominal viscera which are the consequences of intermittent fevers; he also cites Zimmermann's opinion that it is the best remedy for the dispersion of pulmonary tubercles.† Kaempfer and his followers made extensive use of taraxacum in the form of enemata in almost all the chronic diseases of the abdomen, and with great success, if we may judge from the reputation which their method of treatment acquired.‡

\* For the effects and mode of employing minute doses of mercury we refer to Dr. W. Philip's work "On Indigestion," and his more recent work "On the Influence of Minute Doses of Mercury," &c. 1834.

† *Traité de la Maladie Scrophuleuse*. Traduit et accompagné des Notes par J. B. Bousquet, p. 275 et seq.

‡ Op. cit. See our sect. on *Pathology*, p. 324.

After a few doses of mercurial alteratives, a course of taraxacum, steadily pursued for several weeks during the spring or summer, will often produce a very beneficial effect. The expressed juice is the form in which it is usually given on the continent, where it is considered infinitely superior to every other preparation of the plant, and we think that it deserves a preference when it can be procured. The extract, however, when well prepared, contains, we believe, the virtues of the plant, and is more readily taken than either the expressed juice or the decoction. We usually prescribe it in combination with some tincture of hops and aromatic water, and in this form we find no difficulty in getting children to take it for many weeks. The bowels require attention, and an occasional laxative will generally be beneficial in all cases during its use.

*Sarsaparilla*.—Although the powers of this medicine have been very differently estimated, and the cases in which it is most beneficial are by no means well ascertained, it has been long used as an alterative. We have frequently found it of service after a course of mercurials or taraxacum, but we think its effects are less salutary when the internal secretions have not been previously improved. Its influence on the skin is most evident, and it is in a defective state of the cutaneous functions that we prescribe it with the greatest expectation of benefit. In a dry harsh condition of the skin, with a disposition to eruptive affections of the slighter kind, a course of sarsaparilla combined with warm bathing seldom fails to produce benefit. We are of opinion that it should always be given after a course of mercurial alteratives; and being a mild medicine, it may, if administered in such doses as will not oppress the stomach, be prescribed to the most delicate patients. The infusion of the root in distilled or lime-water is the preparation we usually prefer.

*Antimony* has been much extolled for its alterative powers. The once-celebrated antihæctic of Poterius consisted of oxide of antimony and tin. Hufeland has the highest opinion of antimony in correcting the strumous diathesis.\* We have not often administered its preparations alone as alteratives, but very frequently in combination with other medicines of the same class, more particularly with mercury, and occasionally with sarsaparilla. When a disposition to fever, with a dry hot skin, or bronchial irritation, exists, we consider antimony a valuable addition to any mild alterative which may be suited to the case.

*Sulphur*.—The great frequency of cutaneous affections in strumous constitutions has led to the use of sulphur, and we regard it as a valuable remedy in many cases. We have the authority of Bordeu for the powerful effects of the sulphureous waters of the Pyrennees in the cure of scrofula; and in some forms of strumous diseases we have a high opinion of them. In the cases to which we allude, the skin is coarse and dry, and the whole constitution is of a torpid character; but in the more delicate

\* Op. cit. p. 166.

class of strumous patients with a thin skin, the use of sulphureous waters requires much caution.

We consider the mineral waters of this class the best form of administering sulphur; bathing should generally be combined with their internal use; and when the water does not act on the bowels, they should be kept open by laxatives. Bordeu combined mercurial frictions with the sulphureous waters of Barège; but this is unnecessary when the patient has been properly prepared for the operation of the waters by a course of mercurial or vegetable alteratives, which, if not always necessary, will very generally be useful, and render the course of sulphureous waters more effectual.

*Mineral waters.*—We consider mineral waters superior in efficacy to all other alterative medicines.

The operation of these invaluable remedies may be so directed as to promote all the secretions and excretions, to influence the functions of almost every organ, and improve the condition of the circulating fluids. In strumous habits, affected with great abdominal plethora, a defective state of the biliary secretion and an unhealthy state of the skin, &c., no remedy with which we are acquainted is so well calculated to produce a full alterative effect on the whole system as a well-directed course of mineral waters, combined with warm bathing. They are not, however, suited to every person of the strumous constitution. In the class of cases we have just described, the advantage of them is at once apparent; but in young persons of an excitable temperament, their operation, even though they be of the mildest kind, will scarcely be borne with impunity. The waters of this class in which we have the greatest confidence, and from which we have observed the most marked benefit, are those of Ems, of Carlsbad, of Marienbad, and Eger.

The purer chalybeate waters have also been esteemed valuable remedies in correcting the scrofulous constitution. Morton considered them the most useful of all preventives of phthisis, and he states that he has seen some cases of evident consumption perfectly cured by the use of these waters, “et sine ullâ recidivione redditos:” he also found them of great utility in chronic cases of phthisis accompanied with hemoptysis, when taken daily for a long time in small quantities.\*

It would be encroaching on another department of this work to go further into detail on the subject of these remedies; but we cannot conclude these few observations without expressing our belief, that when the powerful influence of mineral waters over the extensive class of diseases which have their origin in abdominal plethora and deficient excretion, together with the mode of exhibiting them, is more generally understood, they will be more frequently employed and more fully appreciated.†

*Alkalies.*—This class of medicines has often been employed as alteratives in the treatment of scrofulous diseases, and chiefly with the view of correcting the constitutional diathesis. The theory which gave rise to the employment of alkalies, namely, that acidity was the chief cause of scrofula, is now exploded; still these remedies are held in considerable repute and are unquestionably useful.

The fixed alkalies are mostly used in this country, the liquor potassæ, the carbonates of potass and of soda being the forms in which they are chiefly used. The mode in which they act is not well understood; they evidently increase the urinary, and appear to have some influence in promoting the bilious secretion, and in rendering that of the mucous membranes more fluid. Their alterative action on the skin is also evinced by their abating cutaneous irritation; and the effects of the liquor potassæ in correcting the disposition to boils is very remarkable. But, whatever be their mode of operation, they are certainly beneficial in many tuberculous affections; they also form valuable adjuncts to purgative medicines.

Lime-water has been long held in estimation: Morton prescribed it in combination with the decoction of sarsaparilla; Hufeland, also, speaks in high terms of its efficacy in glandular swellings, in mesenteric disease, and even in incipient tubercular phthisis. The muriates of lime and of baryta were likewise, at one time, in great repute in the treatment of scrofulous diseases, and are at present too much neglected.

We would here remark that during the use of all the alteratives we have noticed, the warm bath will be productive of considerable benefit. By promoting a free circulation in the cutaneous vessels, it favours the action of those medicines which act specifically on the surface, relieves internal congestion, and thereby indirectly aids also the operation of those alterative remedies which exert their influence on the abdominal secretions.

2. *Purgatives.*—These medicines are chiefly useful in obviating constipation, or in promoting the operation of alteratives; but their employment in the tuberculous subject must be regulated by certain restrictions.

In a torpid state of the bowels with little disposition to irritation of the alimentary canal, active purgatives may be occasionally useful; but we beg to enter our protest against the indiscriminate practice of active purging which still prevails too generally in the early stages of tuberculous disease. It is lamentable to observe the injurious effects of this practice in the debility which it produces, and in the irritation which it establishes in the mucous surfaces. Although we consider abdominal congestion as forming so important a part in the pathology of tuberculous diseases, we regard the frequent repetition of harsh purgatives

supply an accurate imitation of the most esteemed waters of the north of Europe. At this well-conducted establishment an opportunity is given of varying the water according to the state of the patient,—the advantages of which are obvious.

\* Op. citat. lib. ii. cap. ii. et ix. lib. iii. cap. v.

† We are unwilling to quit this subject without calling the attention of our readers to the artificial mineral waters prepared at Brighton, and which

as the worst possible means of remedying it: a single dose or two of cathartics often gives relief by the copious discharge which is excited from the liver and mucous surfaces; but their frequent repetition never fails to do injury. Entertaining these views respecting the action of purgatives, we read with much pleasure the strong opinion of Dr. Stokes of Dublin, a valuable contributor to this work, on the same subject. Speaking of the influence of gastro-enteric disease in accelerating the fatal termination of phthisis, he says, "I feel satisfied, that under a different mode of treatment from that ordinarily employed, this complication would be much less frequently observed; as in numerous instances I have known it to be induced clearly by the use of purgative medicines. If ever there was a case in which we should be cautious in giving medicines of this description, it is in incipient or threatened phthisis, on account of the great liability that exists to inflammation and ulceration of the digestive tube; yet, in all those cases, which, in conformity with the prejudice of the day, are supposed to arise from a *disordered state of the stomach—of the digestive apparatus—a depraved state of the biliary organs—atony of the chylopoietic viscera, &c. &c.* a set of terms invented to cloak ignorance, and conveying no single clear idea to the mind, this practice is constantly pursued—a diarrhoea is established, and the digestive apparatus becomes indeed disordered, more from the remedies than the disease."<sup>†</sup>

The very prevalent use of active doses of calomel and strong purgatives in delicate strumous children is productive of a degree of mischief which is not sufficiently known: the great error in the administering of such medicines is their excessive dose and too frequent repetition. Where they are given simply as laxatives, and their repetition is regulated according to the nature of the case, especially when a course of alterative medicine forms a part of the treatment, they may be made very useful in the correction of the strumous habit; but no class of remedies requires to be exhibited with more caution in young delicate persons of a strumous constitution.

3. *Tonics*.—In a disease in which debility is one of the principal features, it is not surprising that tonics should suggest themselves to the mind both of the medical attendant and the patient.

There are two periods during which this class of remedies proves useful;—the first, that which precedes the local deposition of tuberculous matter; the second, the advanced stage of pulmonary disease, when the debility and exhaustion are great. In this latter period in particular, tonics often afford great temporary support.

Chalybeates have an excellent effect in some young persons of a tuberculous constitution. In those who have a languid circulation, a soft relaxed state of muscle, and a pale blood-

less appearance, they are superior to every other remedy with which we are acquainted; but the indiscriminate exhibition of them in all cases of debility is productive of much mischief. Before benefit can be derived from chalybeates, the digestive organs must be free from irritation; otherwise they will generally do harm, however great may be the debility attending such a state. When such derangement of the digestive organs prevails, proper antiphlogistic measures will be necessary to render chalybeates admissible; and if the case in other respects does not contra-indicate their use, they may then be exhibited with great benefit. But we repeat that the indiscriminate manner in which the preparations of iron are too commonly prescribed in all cases of scrofula and debility is productive of more injury than is usually imagined: although they may give a temporary support to the system, they will not fail, when injudiciously employed, to confirm the functional derangement, which it should be our first object to remove.

In the advanced stages of phthisis, when the expectoration is copious and the patient is greatly debilitated, without suffering much from gastric irritation or fever, we have seen remarkable effects from sulphate of iron in improving the patient's strength and abating the expectoration; these were the cases in which Griffith observed so much benefit from his celebrated steel and myrrh mixture. The vegetable tonics are also useful at this period. The sulphate of quinine in small doses, either alone or combined with sulphuric acid, forms one of the best medicines of this class.

4. *Bathing*.—As a means of giving tone to the system and enabling it to bear the vicissitudes of climate, the *Cold Bath* forms a very valuable remedy. We would strongly recommend that it should be used by children and young persons of a scrofulous constitution during the summer, as one of the best tonics they can employ. Sea-water is to be preferred when it can be obtained, and the air of the coast forms no unimportant part of the benefit which is generally experienced from a course of sea-bathing. The same remarks apply to the cold bath as to internal tonics;—unless the functions of the internal organs are in a healthy state, little advantage will be derived from it. It is always necessary, therefore, before prescribing this remedy, to ascertain that the digestive functions in particular are well performed; and when there are strong indications of abdominal congestion, or a dry harsh state of the skin, it will be proper to employ the warm bath as a preliminary measure. But notwithstanding these precautions, there are some children who cannot bear the shock of the cold bath, and are positively injured by it; hence its effects on children must be closely watched. Unless it is succeeded by a glow, a feeling of increased strength, and a keen appetite, it will do no good, and ought to be at once abandoned, and the warm or tepid sea-water bath substituted.

Delicate persons who cannot bear the cold plunge or shower-bath, will often derive great benefit from having the body rapidly sponged

\* Dublin Journal of Med. and Chem. Science, vol. ii. p. 59, 60.

with cold water. This is particularly serviceable to young children, and should in all cases be succeeded by friction over the whole surface. The practice of sponging the chest with sea-water or salt and water daily is also highly useful, and should generally be adopted by delicate persons throughout the whole year. It is a powerful tonic, and a most effective means of diminishing the susceptibility to the impressions of cold.

While on the subject of cold bathing, we must not omit to notice the beneficial effects of *swimming*. When accompanied with this invigorating exercise, the cold bath becomes doubly serviceable. Every boy, as Locke recommends, ought to be taught swimming as a part of his education. The Romans attached so much importance to it, that not to be versed in the art was considered by them as great a reproach as ignorance of reading; *nec literas didicit, nec natum*.

In very delicate children much more benefit will be derived from the tepid than the cold bath. It is, in truth, to them what the latter is to the more robust. The powers of warm and tepid bathing in the treatment of scrofulous children are not sufficiently valued. One of the most powerful means which we possess of relieving abdominal congestion, improving the functions of their skin, and giving tone and vigour to their whole system, is a course of warm sea-bathing with active friction over the whole surface after each bath; the temperature of the bath towards the termination of the course being gradually reduced till it becomes tepid. The opinion that warm baths generally relax is erroneous; they are no doubt debilitating when used by persons of a weak and relaxed constitution, or when continued too long; but on the contrary they invariably give tone when employed in the cases to which they are properly applicable. We have already remarked that warm bathing greatly promotes the action of alterative medicines; these two remedies should therefore be combined when possible.

Of medicated baths we have had no practical experience: common salt and the carbonate of soda are the only substances which we have used in this way, and from both we have observed good effects. Baths of malt, of bark, of hemlock, and other substances supposed to have specific effects, have been particularly mentioned by foreign authors. Hufeland states that he has seen surprising benefit derived from hemlock baths, repeated daily for weeks, in removing glandular swellings, cicatrizing ulcers, &c.; and he considers bark and other astringents, when employed in this way, much more useful than when administered internally.

The excellent article *BATHING* is so full of information, and lays down such judicious rules on the employment of baths generally, that we consider it unnecessary to enter further upon the subject.

5. *Travelling, Sailing, Climate*.—These are valuable means of improving the health of persons of a tuberculous constitution; and when no local disorder exists to prevent their beneficial

influence on the system, they may be made powerful remedies for correcting the disposition to tuberculous disease. But these measures must be used for a long period; a residence for a few months only in the finest climate, or travelling under the most favourable circumstances, cannot be expected to do much in correcting a constitutional disorder which may have existed from birth. Their positive advantages also will depend upon their being adapted to the circumstances of the individual case, and upon a strict attention to those regulations respecting regimen, exercise, &c. which are deemed proper; for neither these nor any other measures which act on the system generally will prove of much permanent benefit, unless those local derangements which almost invariably exist in the scrofulous constitution are removed before they are adopted. It is from a want of due consideration of these circumstances, and from an over-confidence in the unaided effects of the measures to which we have alluded, that so little benefit is often derived from them.

When proper regard is paid to all the circumstances of the patient, and the measure is adopted with the necessary precautions, travelling will be attended with many advantages. Independently of its physical effects, the change of scene and the constant succession of new objects presented to the young traveller, exerts a direct and most beneficial influence on the mental constitution; the mind is thereby engaged, the nervous system is soothed, and a just harmony is established between the various functions of the whole economy. If he happens to be fond of natural scenery, or to take delight in the practical pursuit of any branch of natural history, the beneficial effects of a residence in a mild climate may be much augmented. For this reason we think that a taste for botany, geology, and similar pursuits, which necessarily induce the invalid to take exercise in the open air, should always be encouraged in young persons of a delicate constitution; the study of marine botany and of the various branches of zoology which can only be pursued on the sea-shore, also contributes greatly, when used with proper precautions, to amend the health.

When more distant journeys or voyages cannot be accomplished, short and repeated voyages and excursions, within the limits of our own country, may be made beneficial during the continuance of mild weather. It is chiefly with the view of avoiding the winter that foreign residence is recommended; but this will be more fully considered when we treat of the effects of climate in incipient phthisis.

#### SECT. XIII.—TREATMENT OF PHTHISIS.

In entering upon the consideration of the treatment, with a view to lay down rules for its application to the different stages of phthisis, we beg to refer the reader to a former part of this article, in which the disordered states preceding and accompanying the local deposition of tuberculous matter are fully described. We have there endeavoured to pour-

tray the characteristic features of the tuberculous constitution, and we would now simply observe that a familiar acquaintance with these is of the first importance to the practitioner, inasmuch as they will assist him greatly in forming a correct judgment of the case, more especially when the signs of local disease are equivocal or obscure. The condition of those organs and functions which are more immediately connected with nutrition claim our particular attention, for it seldom happens that they do not manifest evident derangement; and when such derangement exists, we may feel assured that we shall make little progress in the treatment of the pulmonary affection until it is removed or corrected. There is, no doubt, considerable variety in the manner in which the digestive organs are disordered in tuberculous persons, depending in a great measure on the nature of the causes which have induced such disorder. But there is one prevailing form in which the dyspeptic symptoms have their origin, and which we have already noticed in describing the tuberculous constitution, and referred, for a more full account of it, to the article *INDIGESTION, Strumous Dyspepsia*. We may, however, observe, that as we consider it to depend on congestion of the whole abdominal venous system and on an irritated state of the mucous surfaces, it will, we believe, be remedied by whatever allays irritation, promotes the various secretions and excretions of the chylopoietic viscera, and induces a more active state of the cutaneous circulation. But these remedial measures, as well as all others which are applicable to the treatment of incipient phthisis, require to be modified according to the predominance of particular symptoms. Thus, in some cases, the disorder of the digestive organs,—in others the morbid state of the skin, is the most prominent derangement:—again, in some there is a torpid and inactive condition of the whole system, with a languid circulation and deficient nervous sensibility, while in others the converse of all these prevails. Hence it is apparent that the treatment must be varied to meet the circumstances of each case, although the principles upon which it is conducted are the same, and the same general objects are to be attained in all.

The most efficient general means of correcting the tuberculous constitution and removing functional derangement, have been described in the last section; we shall, therefore, proceed to consider those measures which have been thought to possess particular powers in the cure of phthisis.

1. *General Remedies*.—It would far exceed the proper limits of this article to enter into an account of all the remedies which have been at various times extolled as capable of curing phthisis. The greater number of them had their origin in empiricism; and although they obtained some renown in their day from the credulity of the public, they were, in general, found utterly inadequate to accomplish the cures promised by the ignorant or deceitful pretenders who introduced them. Passing over,

therefore, a long list of nostrums which have justly been banished from modern practice, we shall merely notice those remedies whose beneficial effects are tolerably established, either in the treatment of the disease generally or in the relief of particular symptoms.

1. *Bloodletting*.—Small and frequently-repeated bleedings have been recommended by various authors as a means of curing incipient phthisis. Morton employed bleeding in the early stages of the disease and for the prevention of hemoptysis, to the extent of from six to ten ounces, and repeated it two or three times at proper intervals, when its repetition was indicated. He considered that it was not only ill adapted, but positively destructive in the confirmed stage of phthisis; but when employed in due season, and aided by the judicious exhibition of other necessary remedies, it was most successful in guarding against inflammation, congestion, and subsequent ulceration of the lungs, and even phthisis itself, with cough, dyspnoea, and its other train of fearful symptoms.\* But the practice of repeated bleedings was first brought into general notice in this country by Dovar, whose extravagant partiality for the remedy, and excessive employment of it, probably led to its unmerited disuse. His plan was to bleed to the amount of six or eight ounces every day for the first fortnight, and gradually to increase the period between each repetition of the measure by employing it at the respective intervals of every second, third, and fifth day for the three successive fortnights.† Mead speaks strongly in favour of the same practice;—"I have seen cases," he says, "judged almost desperate, where this method of practice succeeded well."‡ Sir John Pringle says, "In the first stage of a consumption, when the patient complains of pains in his side, constriction at the breast, or hot and restless nights, I have trusted most to small and repeated bleedings: the quantity of blood drawn was from four to seven or eight ounces, once in eight or ten days; and sometimes a vein was opened after shorter intervals."§ Dr. Monro says that the plan of "taking away from four to eight ounces of blood whenever the pain of the breast was troublesome, or the patient was hot and restless at nights from the hectic fever, gave the greatest relief of anything we tried; and these repeated small bleedings were so far from wasting the patient's strength, that they rather seemed to prevent its being exhausted so fast as otherwise it would have been, by allaying the force of the hectic fever."|| It is to be recollected that Pringle and Monro were army-physicians, and that their patients were more likely to require and derive advantage from bleeding than the ge-

\* Op. cit. lib. ii. ch. 2.

† The Ancient Physician's Legacy to his Country. By Thomas Dovar, M.D. p. 26. Lond. 1733.

‡ *Monita et Præcepta Med.* c. i. s. x.

§ Observations on the Diseases of the Army, part iii. ch. 3.

|| Account of the Diseases in the British Military Hospitals in Germany, &c. p. 131.

nerality of consumptive patients in private life. Fothergill always found benefit from repeated venesection, except in delicate constitutions; and Stoll considered it the best remedy that could be employed. More recently several physicians have spoken favourably of the practice of bloodletting. Dr. Hosack of New York states that he has "in many instances employed it with the most happy effect in incipient phthisis, even when strong hereditary predisposition existed."\* Dr. Cheyne of Dublin has also lately written a paper in which he gives a very favourable opinion of this practice in hemoptysis, and also in incipient pulmonary phthisis; in both of which he states that "these small bleedings may be practised with safety, and often, if I mistake not, with more advantage than any other remedy in use."† Dr. Cheyne's view in adopting this practice is to subdue the inflammatory state of the lungs produced by the irritation of tubercles, and to arrest the progress of the disease in its early stage: he employs small bleedings once every week or ten days in those cases which he conceived to be incipient phthisis, "and with a degree of success which forbids the relinquishment of that practice."

The greater number of the advocates of this practice evidently adopted it not only after tuberculous disease of the lungs had taken place, but after this had become complicated with inflammation. Before the disease has advanced thus far, the circumstance which calls chiefly for venesection is pulmonary congestion. In this case a moderate bleeding will always, we believe, be useful; and when employed as soon as the congestion is evident, will often prevent hemorrhage and inflammation, and perhaps the deposition of tuberculous matter. When the patient has been subject to natural discharges of blood from the nose or otherwise, bloodletting is the more necessary. It rarely happens, we believe, that general bleeding requires to be frequently repeated if the patient be put upon a proper regimen, and the necessary remedies are employed to diminish abdominal plethora. When it is frequently repeated, the quantity abstracted should be diminished each time, and the intervals increased.

We have a high opinion of the beneficial effects of Local Bleeding in cases of this kind, and we believe that the abstraction of small quantities of blood from the chest by cupping will be the most effectual way of relieving the inflammatory action which accompanies tuberculous disease of the lungs, after congestion of the large vessels has been diminished by one or more general bleedings.

2. *Emetics*.—The effects of emetics appear to be so important, and their utility in pulmonary diseases has been so highly commended by some of our best practical writers, that we think it proper to devote some space to the consideration of the practice.

From an early period in the history of me-

dicine, emetics have been employed in the treatment of phthisis; and, although they were prescribed with various views by different practitioners, their beneficial effects when judiciously exhibited have been generally acknowledged. Some considered them chiefly useful in unloading the stomach and biliary system; some used them as the means of suppressing pulmonary hemorrhage and inflammation; while others regarded them as capable of curing phthisis in its early stages. It is our present purpose to examine the grounds upon which this last opinion rests.

We have the positive testimony of several practical physicians in favour of the remarkable benefit derived from the use of gentle emetics repeated at short intervals during the early stages of tubercular phthisis. Morton states that after bleeding they are of great utility in the cure of this disease, and that they will often check it in its early stages; the opinion of this eminent physician is so clearly and strongly expressed that we shall give it in his own words: "A quæ vomitione non tantum ventriculus humorum saburra oppressus relevari, et nausea inde nata tolli, et digestio restitui possint, (quæ omnia non sunt flocci habenda,) verum etiam moles humorum jam pulmonibus impactorum, harum partium exagitatione inter vomendum, insigniter expectorari solet, unâ cum notabili relevatione ponderis gravativi à mole istâ effecti. Atque hoc ritu non tantum plurimos empiricos vidi, cum successu felici, sese omnem incipientem phthisin curaturos gloriarî, verum etiam ipse ego ratione et experientiâ fretus sæpissimè phthiseos incipientis progressum, eodem modo, brevi temporis spatîo, præpedivi."\* Again, in regard to cases complicated with hysteria and hypochondriasis, he says, "vomitoria verò lenia, et ægri viribus æqualia, opitulando cerebro et nervis, in principio morbi, instar miraculi hujusmodi phthisicos relevare solent."† Since Morton's time, emetics have been recommended by several eminent physicians; Dr. Simmons warmly advocates their use, and lays down some excellent directions for their employment; he believed that "the earlier in the disease they are had recourse to, the more likely they will be to do good, and the less likely to do harm."‡ Dr. Parr says that "no remedy is so generally useful as a slight emetic frequently repeated; and could phthisis be ever cured, it would be by the joint action of emetics and blisters."§ Dr. Bryan Robinson,|| Dr. Thomas Reid,¶ and Dr. Marryat,\*\* have urged the employment of emetics in still more forcible language,

\* Op. cit. lib. ii. cap. viii.

† Ibid. lib. iii. cap. iv.

‡ Pract. Obs. on the Treatment of Consumption, p. 67.

§ London Med. Dict. art. *Emetics*.

|| Observations on the Virtues and Operations of Medicines, 1752, p. 146, et seq.

¶ Essay on the Nature and Cure of the Phthisis Pulmonalis, 1782.

\*\* Therapeutics, or the Art of Healing, 1817, p. 45.

\* American Med. and Philos. Register, vol. ii. p. 470.

† Dublin Hospital Reports, vol. v. p. 351 et seq.

and have fully confirmed by their own experience the value of the remedy in the early stages of phthisis. Dr. Dumas, of Montpellier, one of the translators of Dr. Reid's work, also cites several cases in corroboration of the practice; and more recently Bayle, a high authority, has mentioned emetics, frequently repeated, among the most valuable remedies in the early stages of phthisis.

The most recent experiments with emetics are those by Dr. Giovanni de Vittis, chief physician to the military hospitals of the Neapolitan army. In the military hospital at Capua, where the greater number of phthisical patients of the army are sent, antimonial emetics were tried in every case. From the 1st of May, 1828, to the 18th of January, 1832, there were sent out of the hospital perfectly cured (*perfettamente guariti*) forty cases of *chronic catarrh*, forty-seven of *phthisis* in the first stage, one hundred and two in the second, and twenty-seven in the third, making a total of two hundred and sixteen cures, of which one hundred and seventy-six were cases of phthisis. The mode of treatment consisted in giving every morning and evening a table-spoonful of a solution containing three grains of tartarized antimony in five ounces of infusion of elder flowers, and one ounce of syrup. The patients were at the same time put upon a light farinaceous diet, composed chiefly of rice, chocolate, and biscuits. A second spoonful of the emetic mixture was given at the end of a quarter of an hour when the first dose did not produce vomiting. If it excited brisk purging, it was omitted for some days, and roasted ipecacuan and digitalis, which are said to produce wonderful effects in curing this diarrhoea, were administered in the proportion of one grain of the roasted ipecacuan powder to one of digitalis, and repeated every hour or oftener, until the diarrhoea ceased. We give this report from an Italian medical journal,\* as we have not yet been able to procure Dr. Giovanni's work. Although we may be permitted to entertain doubts as to the validity of the cures, especially of those in the advanced stage, we cannot doubt that the practice must generally have produced very beneficial effects.

The extent to which vomiting was carried by the advocates of this practice surprises the practitioner of the present day. Robinson states the case of a consumptive patient, subject to repeated attacks of hemoptysis, who was kept alive for eight years by taking three ipecacuan emetics every week during that period; Reid says that they may be taken every morning and evening with perfect safety for months; and Richter gives the case of a woman, aged forty, who took six hundred emetics in ten years. There can be no doubt that the physicians who employed emetics

thus extensively were fully assured of the advantages which they produced, and their patients must have been equally sensible of the benefit derived from them, otherwise it is scarcely credible that a practice so disagreeable would have been prescribed, or persevered in, for so long a period. But if such marked effects were observed to follow the employment of this remedy, it may well excite surprise that it has been allowed to fall into disuse; for at present emetics are merely used as palliatives, and are by no means generally considered of importance in the cure of phthisis. Two causes may be adduced in explanation of this fact; the first, the disagreeable nature of the remedy; the second, the want of firmness and decision on the part of the physician in enforcing a practice, the value and operation of which he could not satisfactorily comprehend. If we can succeed in removing the latter objection by showing how emetics may be made the efficient means of preventing phthisis, the former difficulty will be easily overcome.

The minute researches of Dr. Carswell on the morbid anatomy of tubercle, have satisfied him that tuberculous matter is first deposited on the free surfaces of mucous membranes, such as the bronchial membrane in the lungs, and that of the biliary ducts in the liver. It is very probable, as Dr. Carswell remarks, that tuberculous matter is equally deposited on the surfaces of all mucous membranes, but is speedily removed from many, such as the intestinal canal, by the constant action kept up in them by the passage of foreign substances; while the structure of the lungs is such as to favour the retention of the morbid deposit. For a full account of Dr. Carswell's views on this subject, see the article TUBERCLE; the clear manner in which he has there explained the cause of the more frequent occurrence of tuberculous matter in the lungs than in other organs, and in the upper lobes than in the other parts of the lungs, is so satisfactory that it is unnecessary for us to enter more into the subject here.

The power of emetics in augmenting the bronchial secretion and ejecting it from the lungs is well established: and, therefore, we can easily conceive how the repeated action of emetics may prevent the deposition, or at least the accumulation, of tuberculous matter in the bronchial ramifications and air-cells, and thus prevent the *localization* of the disease, and give time for the correction of the constitutional disorder. In this manner, it is not improbable that a judicious use of emetics may prove a powerful means of preventing the deposition of tuberculous matter in the lungs.

We cheerfully acknowledge that our attention was first particularly directed to the benefit which may be derived from emetics in phthisis, by Dr. Carswell's researches into the primary seat of tubercle, and whatever advantages may be hereafter experienced from the adoption of the practice, the merit justly belongs to him. If the researches of this enlightened pathologist

\* *Annali Universali di Medicina*, Dicembre, 1832.—“ Osservazioni ed esperienze sulla tisi polmonare seguite da un metodo particolare per la cura di tal malattia; del dottor Giovanni de Vittis, primo medico degli Ospedali militari dell'armata di terra di S.M.—Napoli, 1832.”

had led to no other result than the establishment of the important fact, that tuberculous matter is first deposited on mucous surfaces, and that it may be expelled from them in the way we have described, he would have conferred a great benefit on mankind.\*

Although we regard the action of emetics on the pulmonary system as one of their most valuable effects, we are not disposed to limit their utility to this, but consider that their determining the circulation to the surface and promoting the biliary secretion constitute very important parts of their operation. They equalise the circulation, restore the secretions which are usually deficient in the tuberculous constitution, and tend to diminish abdominal congestion: hence emetics may be ranked, as Dr. Reid justly observes, among the most powerful alterative medicines which we possess.

Having said thus much on the subject of emetics and their operation, it is right to state that our own experience of the practice has not yet been very considerable; but we think we shall be held justified in earnestly calling the attention of the profession to it, as one which holds out to us the rational hope of being made one of the most efficient means of preventing the localization of tuberculous disease in the lungs in many cases, and perhaps of removing it in some others. For ourselves, we do not hesitate to say that, resting on the discovery of Dr. Carswell, and on the strong testimony of the respectable writers whose authority we have cited, we shall continue to avail ourselves of every fair occasion to put the practice to the test of experience. That it is a safe practice when adopted with discernment, we have abundant proof, even when it is carried to an extent which we deem unnecessary.

If the observations which we have made should bring into more general use the employment of gentle and frequent emetics in the early stages of phthisis, we trust that the measure will not be adopted without that judgment and circumspection which can alone render any active practice useful, or even safe. To have recourse at once to emetics in every instance of threatened phthisis, without fully inquiring into all the circumstances of the case, would be highly injudicious: we shall find that although emetics may be freely given in one class of cases, they cannot be safely exhibited in another without preparing the patient for them by bleeding, purgatives, and proper antiphlogistic measures; and that in a third class, where gastric irritation is a prominent symptom, they

may be altogether inadmissible. There is a state of the mucous membranes of the alimentary canal which frequently attends phthisis even in its earliest stages, and which we consider as strongly contra-indicating the use of emetics. We have already described this state in a former part of this article, but we may observe here that it is attended with the following symptoms:—the whole internal fauces are red, congested, and swollen, the posterior part of the pharynx, as far as the eye can reach, is also of a deep red, and often partially dry and shining; there is thirst, and generally epigastric tenderness on pressure, with redness of the tongue. We have at this moment two young patients in this state under observation, and although they are in the incipient stage of phthisis, we have not ventured to employ emetics, considering them dangerous when these symptoms are present. We would confine the use of ipecacuan in such cases to minute doses, with the view of promoting the secretion of the bronchial membrane.

When tuberculous matter is deposited in the lungs to any considerable extent, the case will require much more attention before the employment of emetics; the abstraction of blood, both generally and locally, and a discharge established over the part by blisters or other means, will be useful, and may be even necessary in many such cases, as preliminary measures, before emetics can be safely administered; and when there is a disposition to pulmonary inflammation, small doses of tartarized antimony, along with those remedies which favour a free secretion of the bronchial mucous membrane, may be employed with benefit, and, in some cases, may be preferable to actual vomiting. Alkalies have been considered valuable medicines in promoting the secretion of the mucous surfaces, and may, therefore, be advantageously prescribed during the use of emetics. In short, while recommending a cautious employment of emetics in the early stages of phthisis, we would not be understood to advise emetics alone, but merely that they should constitute a part of the treatment. The other remedial means which are adapted to the circumstances of the case must be employed at the same time: indeed, it is no small recommendation of the practice of emetics, that it need not interfere with the general treatment which may be considered most suitable to the condition of the patient.

The choice of emetics, the period of employing them, and the frequency with which they may be repeated, are not matters of indifference. Morton preferred and generally prescribed squills; that used by Marryat, and called by him the "dry emetic," consisted of one grain of tartar emetic and three of ipecacuan, taken fasting, without drinking any liquids during its operation. When the diarrhoea was severe, his emetic consisted of four grains of ipecacuan and one of sulphate of copper. Reid preferred gentle doses of ipecacuan, sufficient to puke once or twice; and Simmons recommends sulphate of copper as superior to any other. We consider ipecacuan the safest and best emetic

\* We are aware that all morbid anatomists are not satisfied of the correctness of Dr. Carswell's views, and we have seen objections urged against them in the periodical press and otherwise; but the arguments which have been adduced have little weight with us who know the minute and patient researches of Dr. Carswell, and the pure spirit of philosophical inquiry which directs them; and we hesitate not to predict that the more thoroughly the subject is investigated, the more fully will his views be borne out and established.



for repeated use; it is proper to give it so as to produce a very gentle effect, and we think a very small quantity of fluid only should be taken to promote its action. When the biliary system is much loaded, an antimonial emetic may be useful in the first instance, as it appears to possess more power than ipecacuan in promoting a free discharge of bile.

Morton thought it best to administer the emetic towards evening, and to repeat it every third or fourth day, three or four times, when the patient could bear it and its repetition was indicated. Simmons, Marryat, and Reid regarded the morning as the best time; and when it is considered that the bronchial secretions accumulate during sleep, there are certainly good reasons for coinciding in their opinion as a general rule; although circumstances may occur to render evening the proper time for the exhibition of the emetic: if given before going to bed, it may prevent fever and promote sleep in some cases.

Simmons began by administering emetics twice a week until the symptoms were relieved, and then repeated them every second day, or even every day, for several days together, with good effects. Marryat gave his dry emetic twice or thrice a week: Reid employed ipecacuan every morning, repeating it occasionally in the evening; and he says that this plan may be continued for several months with perfect safety. The repetition of the emetic must, in our opinion, be regulated according to the nature of the case. When it is given with the view of preventing the deposition of tuberculous matter, it may, perhaps, be sufficient to repeat it once or twice a week. When the case is more urgent, and the patient is threatened with the deposition of tuberculous matter in the lungs, or when the presence of this is already suspected, emetics may be much more frequently repeated: but in all cases it will be necessary to watch their effects on the gastric system, and to suspend the use of them the moment they appear to excite irritation there. During the interval between the emetics, it may promote the end we have in view, to give ipecacuan, alkalies, and other medicines which have the effect of promoting the bronchial secretion, in minute alterative doses.

3. *Digitalis*.—There is not, perhaps, a medicine in the *Materia Medica*, concerning the virtues of which in phthisis medical writers have differed so much as *digitalis*; some regarding it as possessed of powers beyond all other remedies, others considering it to have very little efficacy, while a third class have even condemned it as pernicious. No better instance can, perhaps, be adduced of the difficulty of estimating the effects of a medicine. We find Dr. Beddoes affirming that, in general, when he had all possible evidence of the existence of tubercles, the exhibition of *digitalis* has been perfectly successful:—"If I specify," he adds, "that it has succeeded in three such cases out of five, I believe I much underrate the proportion of favourable events."\* Now it is not to be

credited that Beddoes would have spoken of *digitalis* in such terms unless he had observed some very remarkable effects produced by it. At present we may be permitted to doubt his having all possible evidence of the existence of tuberculous disease of the lungs in many of his cases; yet, making due allowance for this, and for his warm imagination and sanguine character of mind, we cannot doubt that he experienced very beneficial effects from *digitalis*. Its utility in dropsy may afford us some explanation of its effects in abdominal and pulmonary congestion. But, whatever be its effects in phthisis, the medicine has wonderfully fallen in the estimation of the profession since the time of Beddoes; and it is now, we believe, only employed in hemoptysis, or with the view of reducing increased action of the heart, and of thereby abating inflammation of the lungs and general excitement of the system.

A series of experiments has lately been made in Paris for the purpose of ascertaining the efficacy of *digitalis*, but they have not added much to our means of accurately estimating its virtues. Medical authors in general are agreed in regard to the power of this medicine in suppressing pulmonary hemorrhage, but differ greatly with respect to its influence in phthisis. We are ourselves equally unable to pronounce a decided opinion. Like several other remedies that have been loudly proclaimed almost as specifics in certain diseases, *digitalis* has failed to maintain, in the hands of others, the character with which it was introduced to notice by Drake, Beddoes, &c.; and we would require a series of careful observations to enable us to ascertain its real virtues.

*Digitalis* is evidently a medicine of great power, although it is quite clear that we are not yet acquainted with the peculiar circumstances under which it may be employed with advantage in phthisis. Of its powers in hemoptysis there can be little doubt; it also possesses considerable efficacy in abating febrile excitement and excitability of the nervous system, and in regulating the action of the heart; hence, when phthisis is complicated with disease of this organ, it is a medicine of great utility.

4. *Iodine*.—The beneficial effects of iodine in scrofulous diseases have led to the belief that it might prove useful in phthisis; and several authors have recommended it in this disease. We have abundant testimony of the alterative powers of this medicine in various forms of scrofula, particularly in those affecting the skin and external glands.\* We have experienced its good effects in scrofulous children, but have never used it in phthisis, although we think it very probable that when employed as an alterative it may prove a valuable remedy in correcting the tuberculous diathesis. Its action seems to be exerted chiefly on the nutritive functions, and its beneficial effects in some cases have been made apparent by the im-

\* See the medical researches on the effects of iodine by Alexander Manson, M.D.; the experiments of Lugol, and the excellent report by M. Baudelocque in the *Revue Médicale*, already cited.

proved health of the patient while taking it. But the reverse of this has been too often the consequence of its imprudent employment, or its exhibition in cases to which it was not adapted.\* In the recent work of Dr. Morton, an American physician, which has just been put into our hands, we find the strongest testimony in favour of iodine in phthisis that we have yet met with. He states that having used it extensively, he is able to express an unequivocal opinion respecting it. "In a large number of instances," says Dr. Morton, "it has appeared, especially in incipient consumption, to arrest or suspend the tubercular secretion, and with it the hectic, marasmus, cough, dyspnoea, and other urgent symptoms. There are some constitutions in which it does not appear to produce any obvious effects, either for better or worse; but in a majority of cases, even in the second stage of phthisis, I have been much gratified with the results. Thus it often relieves the dyspnoea, improves the complexion, and restores the appetite, even when the advanced progress of the disease precludes all hope of recovery. In some instances it has so obviously improved the nutritive function, that patients have increased in flesh by its use, and at the same time recovered, in a considerable degree, a naturally florid complexion."† Dr. Morton is physician to a public hospital, and seems to have had considerable experience. He prescribes the iodine in the form of a solution containing three grains of iodine, and six grains of hydriodate of potash in an ounce of distilled water, from three to five drops of which are given every morning, noon, and night.

The result of the experiments made with iodine in this country does not by any means correspond with that of Dr. Morton. Dr. Baron was, we believe, the first English physician who employed iodine in phthisis; he found good effects result from it in some cases, but whether more extensive subsequent experience has confirmed the favourable anticipations which he formed of the effect of iodine in this disease, we are not aware.‡ Dr. Bardsley, in his excellent Hospital Reports, after stating the valuable effects of the medicine in scrofula, remarks, "It has been my aim to establish the *real virtues* of iodine in a tuberculous state of the lungs. In fifteen well-marked examples of incipient phthisis, I employed this medicine with a strict attention to its effects. In five instances, it appeared at first to arrest the further progress of the disease, but the amendment was only temporary, for the tubercles passed slowly but progressively through their several stages, and death was the consequence of the

extensive disorganization which occurred in the lungs."\*

We are of opinion that this medicine, administered as an alternative, may prove highly useful, when we are better acquainted with its mode of operation and with the cases in which it is particularly indicated.

5. *Climate*.—We have already entered so fully into this subject (see article CLIMATE), and have given such a particular account of the comparative merits of the various places resorted to by pulmonary invalids, that we have little to add here beyond the application of climate to the different stages of tuberculous disease.

a. Since the nature of phthisis has been more fully understood, the expectations from climate as a means of cure have greatly abated, and hence it is much more justly considered at the present time simply as a *preventive* of the disease. When adopted with this view, climate is certainly one of the most powerful remedies we possess for improving the tuberculous constitution, and enabling us to correct the predisposition to the disease. When, therefore, the tuberculous diathesis is strongly manifested, it is most desirable that this measure should be adopted in early life. Children and young persons of a tuberculous constitution, more especially those who suffer much from damp weather, and are very liable to catarrh in this country, escape this by a residence in a mild and drier climate; and by a continued residence therein for several successive winters, their constitution may be so much improved as to enable them to resist the influence of this season on their return. If we were to select the two periods of life at which such a change appears to be most beneficial, we should probably specify that between the third and seventh year, and again that towards the approach of puberty. If the health of the child from the third to the seventh year is maintained in a good state, he is then capable of taking more active exercise in the open air, and various means may be employed to strengthen his constitution which are inadmissible at an earlier age. The period of puberty in persons of a tuberculous constitution is a very critical one; and a residence in a mild climate towards the approach of this important epoch will prove highly beneficial in favouring the full development of the body, and the establishment of those functions which are naturally called into action at this period of life.

But although a change of climate is attended with such decided benefit at the two ages we have here mentioned, no measure promises greater advantages at any time when tuberculous disease is threatened. One winter at this time spent in a mild climate will do more as a preventive of phthisis than several winters when the health is more disordered.

b. During the *Incipient Stage* of phthisis, that is, after tuberculous matter is deposited in the lungs, the power of climate is much less, and much more caution is necessary in prescribing it. A careful and minute examination

\* For an account of the injurious effects of iodine when injudiciously employed, see Dr. Jahn's Report. "De la maladie iodique, ou des désordres qu'entraîne à sa suite l'emploi trop long temps continué de l'iode."—Journ. Complement. tom xxxv.

† Illustrations of Pulmonary Consumption, &c. by Samuel George Morton, M.D., Philadelphia, 1834, p. 130-31.

‡ Illustrations of the Enquiry respecting Tuberculous Diseases, p. 228. et seq.

\* Hospital Facts and Observations, &c. p. 123.

of all the symptoms of the case is imperatively called for on the part of the medical attendant, before he recommends a measure necessarily attended by the excitement and exposures which are in some degree inseparable from a long journey or voyage. Proper preliminary means must be adopted to remove pulmonary congestion and bronchial irritation when these exist, and to induce a healthy state of the functions of the chylipoietic viscera; in short if due precautions are not taken to improve the local functional derangements before the patient leaves this country, the measure may prove highly injurious.

Even under the most favourable circumstances, change of climate ought only to be considered as a means of placing the patient in a more favourable position for adopting such measures as may be proper for his condition; those remedial means and those plans of treatment, which are required in his particular case during his residence at home, will, in all probability, be required in that to which he may migrate; but he will derive this additional advantage from the change, that those measures which would have availed him little in his own country, are likely to prove highly useful under the favourable influence of his new position. Hence it will be apparent that this change must not be allowed to interfere with the use of the various remedies which have been suggested in this and the preceding section.

c. In the *Advanced Stages* of phthisis, when tuberculous disease of the lungs exists to a considerable extent and hectic fever is established, change of climate will be of little avail, and will probably be prejudicial, unless adopted under very favourable circumstances. There are, notwithstanding, some chronic cases in which the measure may prove useful at any period of the disease, even when tuberculous cavities exist in the lungs: we allude to those forms of the disease, already described, in which the tuberculous deposit is very limited, and passes through its various stages of softening, &c. without exciting much local or constitutional irritation.

But, at whatever period the change is adopted, it is of the highest importance to impress upon the mind of the patient and his friends that if the measure is attended with favourable effects, it ought, in a large proportion of cases, to be continued for several successive years, in order to produce a full and permanent influence upon the constitution; and must at the same time be aided, as has been already remarked, by the adoption of such a regimen and the use of such remedies as are known to improve the general health and correct disordered functions.

d. *Particular Climates*.—A full account of the various places in the south of Europe, in the islands of the Northern Atlantic, and in our own country, which have been resorted to by invalids, will be found in the article CLIMATE; our remarks, therefore, in this place will be very general.

Of all climates with which we are ac-

quainted, that of *Madeira* is the best for consumptive persons. We have every year an opportunity of becoming acquainted with its effects upon a considerable number of persons who repair to it in different conditions of health, and we see no reason to change the high opinion we have given of it in the article alluded to. The beneficial effects of a residence for one or two winters in *Madeira* have become much more apparent since the public have been impressed with the necessity of adopting change of climate rather as a preventive than as a means of cure. A few years ago, it was a matter of little moment to select a climate for the consumptive patient, because he was generally in the advanced stage of the disease, without hope of recovery, before the measure was proposed or adopted; and its fatal termination was not infrequently accelerated by the only means to which he looked for safety.

Dr. Renton's report of the effects of the climate of *Madeira* on the invalids who passed the last winter there has just reached us. The total number of pulmonary invalids who arrived there during the season of 1833-34 was 66. Of this number 15 died; 43 returned to their homes; and 8 still remain in the island. "Of the 15 fatal cases," says Dr. Renton, "13 ought not to have left their homes; of the 43 who left the island for England, or other parts of the world, 36 were very much improved; indeed I may say a large majority of them went away well." The result was very different a few years since, when persons were only sent to *Madeira* in the advanced stage of the disease.\*

In point of climate the *Bermudas* and *Canary Islands* approach nearest to that of *Madeira*. The *West Indies* may be suited to some constitutions as a preventive; but when tuberculous disease exists in the lungs, we can only repeat, that the concurrent testimony of all the medical men whom we have consulted on the subject, and whose opportunities of judging were ample, establishes the fact that consumptive cases sent thither from this country proceed much more rapidly to a fatal termination than in temperate climates.

In Italy, *Rome*, *Pisa*, and *Nice*, afford the best climates for consumptive patients during the winter; but no part of Italy is favourable to such invalids during the summer. In the south-east of France, *Hyères* possesses the best climate; in the south-west, the climate of *Pau* is the mildest and most favourable, particularly during the spring.

In this country, *Torquay* presents, on the whole, more advantages than any other situation as a winter residence. Its peculiar position on the southern declivity of a range of limestone-hills by which it is protected from the north and east, the excellent accommodations for the invalid, and the facility of exercise in the sheltered and picturesque country by which it is surrounded, are all advantages which are enjoyed in an equal degree in no other

\* See the account of *Madeira* in our work "On the Influence of Climate."

place in our island. From the extent of sheltered country which the neighbourhood affords, it is also well adapted for exercise on horseback, which we deem of so much importance in the treatment of pulmonary disease.

*Undercliff*, in the Isle of Wight, possesses great natural advantages, and when suitable accommodations are provided for invalids, and upon a superior scale to those which have been hitherto attempted, it will scarcely be exceeded in this country as a winter residence for the pulmonary invalid. *Clifton* affords a good winter residence for those cases in which the digestive organs are much deranged, and the climate of Torquay might prove too relaxing. *Hastings* and *St. Leonards* are the most sheltered situations on the southern coast; but during the autumn months we consider that the climate of *Brighton* possesses more advantages in a large proportion of cases than any other part of that coast, or perhaps of England. On this account it will be advantageous to many invalids to pass the autumn at Brighton and the winter at *St. Leonards* or *Hastings*. The western shores of our island, as the Isles of *Bute* and *Man*, although mild, are too humid to afford good residences to the pulmonary patient.

Our observations on climate have hitherto had reference chiefly to the winter. During the summer, our own country affords a variety of residences; but a frequent change of place during this season is much more useful to persons threatened with consumption than a continued residence in the best situation. The interior and mountainous districts during the summer, and the sea-coast in the autumn afford the best succession of changes. But a tour on the continent, during the summer months, will be productive of still greater benefit. If the tour be made in the more romantic and picturesque countries, the pleasing and continued excitement which is produced by the great variety and beauty of the scenery exerts a more beneficial influence on the whole economy, in a limited space of time, than any other measure with which we are acquainted. Of course, we now allude to persons free from local disease; when this is established, such a tour must be conducted with more precaution.

*Regulated temperature.*—The great object of removing to a milder and more sheltered situation is to enable the invalid to be as much as possible in the open air. Change of climate, therefore, presents much fewer advantages to the confirmed phthisical invalid, who must keep within doors during the greater part of the winter wherever he may reside, and who will find the comforts of home in general much more than a compensation for any additional mildness of temperature. Such patients will derive advantage from maintaining their apartments at an equable temperature, and when this can be accomplished throughout the whole house, it will be far more beneficial than confining the patient to one or two warm rooms. This measure is chiefly suited to cases of chronic phthisis in delicate females and in persons in

advanced life; but in the young at that stage of the disease when we may reasonably entertain a hope of recovery, such confinement is rarely advisable,—indeed it forms an obstacle to the best means of improving the patient's health.

II. *Local Remedies.*—The numerous local remedies which have been employed in the treatment of phthisis may be considered under two heads; those which are applied to the external parts of the thorax, and those which act immediately upon the lungs by means of inhalation.

1. *Local bleeding.*—External remedies have been employed in pulmonary phthisis chiefly with the view of preventing or removing congestion and inflammation of the lungs: the abstraction of blood by means of cupping or leeches is one of the most effectual of these applications, and there are few cases in which they may not be productive of benefit at some period of the disease. In young persons disposed to phthisis, and in those cases in which pulmonary congestion is indicated, we consider cupping on the upper parts of the chest a very useful practice. Two or three ounces may be abstracted from time to time, and dry cupping may be also employed over the whole of the upper parts of the chest. If necessary, this practice may be frequently repeated; and when tuberculous deposits are present in the lungs, such small bleedings may be made very beneficial. We consider cupping a more effectual mode of abstracting blood from the chest than leeches, and the dry cupping which we always employ at the same time, we think of considerable utility. Leeches, however, are perhaps equally beneficial in irritation of the bronchial membrane; and when the larynx or trachea are affected, they may be applied nearer the seat of disease. We would, however, take this opportunity of cautioning the young practitioner not to be too free in the application of leeches in laryngeal irritation; we have known a patient lose his voice entirely by the application of a dozen leeches to the region of the larynx. It is congestion and subacute inflammation only which are generally present in consumptive patients, and local bleedings must be employed with circumspection.

2. *Counter-irritants.*—Among the various remedies which have been employed in phthisis, counter-irritants have long occupied a chief place. They differ considerably in effect; some produce a temporary irritation only, without any discharge, as the common rubefacients; others, as cantharides, excite a copious serous discharge; and others, as tartar emetic, produce deep pustular eruptions; while setons or issues cause a more permanent puriform discharge from the subcutaneous tissue. All the applications which we have mentioned, however different in their action, are useful; and each of them is applicable to particular circumstances.

The simple *rubefacients*, such as camphorated spirits and spirit of turpentine, are chiefly employed in the very early stages with the view of exciting the action of the cutaneous vessels,

and may be applied daily over a great part of the chest. We think that they are of considerable use in an inactive state of the skin accompanied with an irritable condition of the bronchial membrane; they will also often afford relief in slight local pains. *Plaisters* composed of Burgundy pitch and other substances of a similar kind, may be ranked under rubefacients, as they operate chiefly in exciting irritation of the skin; but they also act by effectually protecting the part from cold. We apply them by preference between the scapulæ; they are less inconvenient in that situation, and moreover leave the chest clear for other applications, such as cold sponging, friction, &c.

After rubefacients, *blisters* are in most general use, and when applied in the cases to which they are adapted, and at the proper period, they seldom fail to produce marked benefit. In slight inflammations of the pleura, and in the catarrhal attacks of phthisical patients, blisters give essential relief. In cases where the abstraction of blood, either local or general, is necessary, blisters should for the most part be avoided until the practitioner is satisfied that the further employment of bleeding is unnecessary; this is, in our opinion, the proper period for the application of blisters. Even in catarrh, they should not be applied early in the disease, nor before the febrile excitement has been reduced by the proper remedies; their effects are then very remarkable in removing the remains of the disease; but if employed in the early stage of inflammatory action, they frequently increase the evil by exciting irritation in the system, especially in consumptive subjects; indeed, we consider that the prevailing error in the use of blisters is their too early application.

A succession of blisters is often recommended in phthisis, and when the skin is not irritable, and the patient does not suffer much inconvenience from their operation, they may be of some use; but we never saw them beneficial when they excited much pain and irritation; and in a disease which is attended with so many distressing symptoms, we ought not unnecessarily to add to these by the injudicious application of external irritants: the less uneasiness blisters give, and the greater the discharge they occasion, the more benefit is derived from them. Blisters applied to persons with a thin irritable skin should be covered with a piece of fine muslin, moistened with oil, and they should be removed at the end of six or eight hours; in this way they will produce less irritation.

The *tartar emetic* ointment has been more generally employed of late as an external irritant than any other application, and in general it answers well; although the sanguine expectations entertained by Dr. Jenner of the effects of this remedy are, we fear, far from having been realized.\*

*Setons and Issues*.—Discharges of matter from the subcutaneous tissue have been generally

employed in phthisis, although, in general, their application has been confined to, or at least most frequently adopted in, the late stages of the disease, when they could be of little utility. Issues may be useful in the state of tuberculous cachexia before the deposition of tuberculous matter in the lungs; and even after this period such discharges may have some effect in checking the further progress of the disease, while means are at the same time employed to improve the general health. They are strongly recommended in this stage of the disease by Mudge. "In this critical and dangerous situation," says that judicious practitioner, "I think I can venture to say, from long experience, that, accompanied with change of air and occasional bleedings, the patient will find his greatest security in a drain from a large scapular issue assisted by a diet of asses milk and vegetables."

The cases in which issues are more particularly indicated are full gross habits of body, with little sensibility; and if the patient has been subject to cutaneous diseases or ulcers, so much the more advantage may be expected from them. In such cases issues generally discharge freely, and give little pain; and we agree with Mudge, that when they are applied, they should be so large as to ensure an abundant discharge. In irritable, sensitive, or spare persons with a thin skin, issues or any other form of external discharge, will not prove of much use; the irritation and distress which they occasion more than counterbalance their good effects. Indeed, we think that local discharges of all kinds must be employed with certain restrictions. When they excite little constitutional irritation, they are most beneficial; but, on the contrary, when they produce long-continued pain, increase the action of the heart, or prevent sleep, we cease to continue them, being well assured that their effects on the system are more likely to do mischief than they can otherwise do good.

In regard, therefore, to the class of external stimulants and discharges, we consider that, with due attention to the restrictions we have laid down on the subject of their application, very great advantage may be derived from their employment in allaying pulmonary irritation, and thus affording time for the adoption of such means as are calculated to improve the general condition of the system. He who expects more from these remedies will, we believe, be generally disappointed. For a full account of this subject see COUNTER-IRRITATION.

3. *Inhalation*.—The inhalation of volatilized substances in the form of dry fumes or vapours has been supposed to be beneficial in phthisis, from their being applied directly to the seat of the disease.

*Dry fumigations*.—The inhalation of the fumes of resinous and balsamic substances is a very ancient practice. From the time of Galen and Rhazes such fumigations have been employed in the treatment of pulmonary disease; they were particularly advocated in this country by Bennet and Mead, but have gradually fallen into disuse in modern times.

\* See his Letter to Dr. Parry on the Influence of Artificial Eruptions, &c.

It will not be necessary to go much into detail upon this practice, nor to dwell long on the advantages which have been ascribed to it in the cure of phthisis. In chronic bronchial disease, or even in chronic tuberculous disease, the application of gentle stimulants of this kind to the bronchial membrane may be useful; but before we can decide on the particular cases to which they are applicable, we would require a series of experiments conducted by practitioners well acquainted with the nature of pulmonary diseases.

The only substance applied in the way of fumigation which has attracted much attention in modern times is *Tar*. The vapour of this substance was first recommended to the notice of the profession by Sir Alexander Crichton, who was induced to try it by a conjecture of Mudge, that the salutary effect of sea voyages is greatly assisted by the perpetual inhalation of an atmosphere impregnated with the volatile parts of the resinous and terebinthinate substances in and about the vessel. The vapour is obtained by heating the tar over a spirit-lamp, a small proportion of subcarbonate of potash being previously added to neutralize any pyro-ligneous acid which the tar may contain. The heat should be moderate, and the vapour diffused equally over the chamber of the patient, which should also be carefully maintained at an equable temperature. The success of the tar-vapour appears to have been remarkable in some cases of pulmonary disease accompanied with cough and expectoration; while in others, which were apparently of a similar nature, it produced no sensible benefit, and was sometimes injurious by irritating the lungs or provoking hemoptysis. In the appendix to the last edition of Crichton's work, an account is given of some experiments made with this remedy in the hospital of La Charité at Berlin, by Drs. Hufeland and Neumann; it appears "that of fifty-four patients, labouring under pulmonary consumption, four were cured, six left the hospital in a state of convalescence at their own request, sixteen did not receive any benefit from the remedy, twelve appeared to get worse under the treatment, and sixteen died."\*

We are not aware that any well-conducted experiments on tar-vapour have been made on a large scale in this country, except those of Dr. James Forbes, which were not in favour of it;† and it is reasonable to believe that the general result of the trials has not been such as to encourage the continuance of the practice. Dr. Morton of Philadelphia, in the work already quoted, gives the following favourable opinion of the efficacy of tar fumigation. "After a fair trial with various substances there is no one which I have prescribed in this form with equal success to tar in combination with subcarbonate of potash, in the manner recommended by Sir Alexander Crichton. In truth, I have seen it act like a charm." In chronic catarrh he knows of no plan of treatment that can

vie with this. He also states that the fumigation was employed by the late Dr. Rush of Philadelphia upwards of thirty years ago. For a full account of the effects of tar-vapour, and the mode of employing it, we beg to refer to Sir Alexander Crichton's excellent and sensible work, which will repay the reader, independently of the information it will afford him on the particular subject in question.

*Watery and medicated vapours.*—The inhalation of the steam of water, either pure or impregnated with the virtues of emollient medicines, is also a practice of some antiquity. Bennet and others recommended the respiration of watery vapours arising from decoctions of emollient herbs in cases of phthisis unattended with expectoration; but the inhalation of vapour was not much employed until the publication of Dr. Mudge's sensible work, in the middle of the last century, introduced it to public notice as a remedy for a catarrhus cough and inflammatory affections of the lining bronchial membrane.\* After trying the effects of various pectoral ingredients, he found no vapour so inoffensive and grateful to the lungs as the simple steam of warm water; the apparatus which he employed for its inhalation is still in use, and is generally known by the name of "Mudge's inhaler," but much improved by Mr. Reid, the inventor of the stomach-pump.

In a very irritable state of the bronchial membrane, this author occasionally combined opiates with the warm inhalations, and with great relief of the symptoms. The inhalation of warm water impregnated with narcotic substances has been recommended as useful in allaying irritation of the mucous membrane of the larynx and bronchi; but we are inclined to believe that the principal part of the benefit derived from the inhalation of medicated vapours has, in many cases, been produced by the simple effects of the vehicle. When the air of a consumptive patient's room is very dry, the cough frequently becomes more troublesome, and some advantage is derived from a basin of warm water placed near the patient; the vapour softens the air, and renders it less exciting to the irritated surfaces of the air-passages, and saves the patient the irksome labour of inhaling.

*Chlorine.*—About ten years ago M. Gannal, a French manufacturer, having observed that consumptive patients experienced relief while breathing an atmosphere charged with the chlorine disengaged in the manufacture of printed cottons, suggested it as a remedy for phthisis; and since that time numerous experiments have been made with chlorine in France and this country. M. Gannal, in several memoirs presented to the Academy of Medicine, relates numerous cases in which marked relief was obtained from its employment;† and a case is given by M. Cottureau, in which a

\* Op. cit. p. 243, et seq.

† Remarks on Tar Vapour as a Remedy in Diseases of the Lungs, Med. and Phys. Journ. Oct. 1822.

\* A Radical and Expeditious Cure for a Recent Catarrhus Cough, p. 131 et cet.

† See Potter's Translation of Gannal's Memoirs. Lond. 1830.

cicatrix was found after death in a part of the lung where pectoriloquy and "gargouillement" were distinctly heard eighteen months before:—the patient died of gastric fever.\* Numerous other instances of the apparent success of the remedy have been recorded in the French periodical publications.† In this country, however, the trials made with chlorine have not been attended with such beneficial results: it has frequently afforded great relief, but rarely effected a cure. We have tried it in many instances, and it has in several apparently suspended the progress of the disease; but the cases in which we employed it were in the advanced stage, when tuberculous cavities already existed in the lungs. Many of the cases recorded by others were also far advanced; and there can be no doubt that the cures which have been related as effected by the inhalation of chlorine occurred in persons whose lungs were diseased to a very limited extent only.

The symptom which we have found chlorine most decidedly relieve is dyspnoea; in all the cases in which it was beneficial, the freedom of breathing which it produced was one of its most obvious effects;—it also appeared to allay the cough in some cases;—in others we were obliged to abandon its use from the irritation which it excited; and in the majority of the cases it produced no sensible amelioration of the symptoms.

The mode which we adopt in the use of chlorine is to direct the inhalation to be continued for five minutes only, and to be repeated frequently in the course of the day. We find that a longer period produces a sensation of fatigue, and the patient returns to it with less readiness. We begin with five drops, and gradually increase the quantity to forty, but rarely go beyond this. The inconveniences which we have observed from it are soreness of the mouth and an increase of the bronchial irritation. As a palliative, chlorine may be employed in combination with other remedies calculated to abate pulmonary irritation.

These observations will, we think, apply with equal or greater force to the inhalation of *Iodine* and substances in the *gaseous* form. Hydrogen and carbonic acid gases, and even oxygen and nitrous oxide, have been employed in phthisis, but without any such advantages as entitle them to consideration. When more rational and just views of the pathology of phthisis are generally entertained by the profession, we shall cease to hear it asserted that this disease is to be cured by local applications. We do not, however, condemn such measures as useless; on the contrary, we consider them valuable as palliatives, and of great service as adjuncts to those remedies which are directed to amend the condition of the general health, and to correct the tuberculous diathesis: but we certainly disapprove of any local remedy being relied on as the principal means of curing a disease which depends upon a morbid

state of the constitution. Such an error is founded on imperfect views of the real nature of tubercular phthisis, is productive of much mischief in practice, and cannot be too strongly reprobated.

### III. *Treatment of Particular Symptoms.*

*Cough.*—The relief of this symptom is one of the first indications in the treatment of phthisis; but before we employ any remedies for allaying it by abating the sensibility of the respiratory organs, it will be desirable to examine into the causes which produce the cough, with a view to adopt more effectual means to palliate or remove it.

If we find that it depends upon bronchial irritation, which is usually the case, the application of leeches followed by rubefacients and blisters over the upper part of the sternum, are the most direct remedies we can employ. In other cases when it depends upon gastro-hepatic irritation and congestion, leeches and a few alterative doses of mercury with laxatives will be the best means of relieving it.

But it does not often happen that the cough is severe at this early period of the disease; it is as this advances and the local disorganization extends, that this symptom becomes frequent and distressing. In addition to the general means employed in the treatment of the disease, it will then be necessary to give medicines to abate the cough and procure sleep; with this view, the usual narcotic medicines should, we think, be tried before recourse is had to opium, which, though it is one of the most valuable medicines we possess in the treatment of phthisis, should be used as sparingly as possible in the early period of the disease, in order that it may be more beneficial in the later stages. One of the greatest errors committed in the treatment of phthisis is, in our opinion, a too early and too frequent use of opium in large doses: we have often obtained the full effects of an opiate from four or five drops of the solution of the muriate of morphia without any subsequent inconvenience; indeed it is always desirable to begin with the smallest doses, because, as the disease advances, it is generally necessary to increase the quantity, and vary the preparation, as it often becomes in the last stages the chief solace of the patient amidst his multiplied sufferings.

When the cough is kept up by an accumulation of mucus in the bronchi, and the patient has much difficulty in expectorating, a gentle emetic will often afford great and almost immediate relief, and save the patient hours of harassing cough, and a restless night.

*Hemoptysis.*—The pulmonary hemorrhage which attends the early stages of phthisis, we believe to be in almost every case dependent upon congestion of the lungs, and hence we consider venesection the most effectual remedy. The quantity of blood abstracted must be regulated by the urgency of the symptoms and the constitution of the patient; and when due attention is paid to these circumstances, we believe that venesection is always useful and generally necessary. Until the sanguineous congestion and the increased action of the heart

\* Journ. Hebdom. t. ii. 1831.

† See Archives Générales de Médecine.

which generally attends active hemorrhage is somewhat abated, medicines given with the view of suppressing the hemorrhage will for the most part produce little effect. We have never had occasion to regret the employment of bleeding, nor have we observed in our practice any evil consequences result from it. The quantity of blood abstracted need not in any case be great; but if the hemorrhage should return, and especially if the excitement of the circulation should continue, venesection may be required frequently, and at short intervals, before the hemorrhagic action ceases. When there exists a disposition to frequent returns of hemoptysis, small bleedings repeated from time to time form the most effectual and, in some cases, the only means of arresting the hemorrhage. One of the most striking cases illustrative of the efficacy of this practice is recorded by Dr. Cheyne, in the fifth volume of the Dublin Hospital Reports. As the gentleman who was the subject of this case was under our care for some time before he became Dr. Cheyne's patient, and his case is altogether a very interesting one, we shall give some account of it here. This gentleman had been subject to hemoptysis for many years; but, after his return from Italy, where he had been for some time under our care, it greatly increased. During four months he had every day from three to four attacks, and at the end of February, 1825, was reduced to such a state of weakness and emaciation that he was unable to move from his chair to his bed without assistance. It was in this condition, after having experienced the inefficacy of other remedies, that Dr. Cheyne had recourse to frequent small bleedings. Six ounces of blood were taken from the arm, which had the effect of suspending the return of hemoptysis for four days, when he had a slight relapse; six ounces were again abstracted, and no return of hemoptysis occurred for ten days. From this time three or four ounces of blood were regularly taken from the arm every week for a year, and once every month or six weeks for another year. During the first eighteen months the blood was invariably cupped and buffy, but after that time it assumed the natural appearance. The pulse during the whole period of the complaint was never much accelerated; the most unpleasant symptom was a sensation of weight in the chest in the recumbent posture. Another circumstance deserves notice:—the digestive organs, which had been constantly deranged during his illness, improved immediately after the bleedings were commenced and the hemoptysis was checked. In reviewing the whole history of this case, we have little doubt that the abdominal circulation was the primary seat of congestion: the early attacks of hemoptysis were preceded by constipated bowels, and the patient suffered from pain in the region of the liver, with dyspepsia, headache, and depression of spirits.

We are enabled, by a communication just received from this gentleman, to give an account of his health subsequent to Dr. Cheyne's report (1827). He states that he enjoyed good

health, with the exception of an occasional slight attack of hemoptysis, for which the lancet was used, up to April 1830, when the hemorrhage returned in a greater degree, and continued to recur frequently for two months unchecked by bloodletting. When reduced to great weakness he tried carriage exercise in the country, which appeared to have the most beneficial effects in allaying the hemorrhage; and in the course of two months he was able to return to his clerical duties. In May 1831 he had another attack, and again in December 1832; since which time he has had no serious return, and has not used the lancet since December 1833. He adds that he is now, October 8, 1834, quite well, between twelve and thirteen stone weight, takes much exercise on horseback, and feels no inconvenience whatever from reading the service and preaching twice on the same day. There cannot be a stronger instance of the beneficial effects of small bleedings in suspending hemorrhage than this case affords, and if this practice had not been so judiciously adopted by Dr. Cheyne, the patient must inevitably have sunk under the continued recurrence of pulmonary hemorrhage. But we are disposed to think the remedy was relied on too exclusively in this case; and the faith of the patient in its efficacy is now somewhat shaken.

The practice of small bleedings may be adopted, we believe, in other hemorrhagies with advantage, as in hemorrhage from the bowels, menorrhagia, epistaxis, &c.

*Local* bleeding, especially by leeches, in the early stage of hemoptysis, or even when there exists a congestive state of the lungs, with a disposition to hemoptysis, is, in our opinion, a dangerous practice, and likely to produce the effect it is intended to remove or prevent. This was exemplified in the patient whose case we have just recorded: while at Rome, leeches were applied to the anus, with the view of relieving abdominal plethora, and before they had ceased to bleed, the patient was attacked by copious hemorrhage from the lungs, which it required several general bleedings to subdue. In a slighter degree we have frequently observed this effect produced by leeches, and we consider the practice of abstracting blood in this manner from a person threatened with hemoptysis or apoplexy not free from danger. In all cases where the object is to relieve congestion of the large vessels, general bleeding is the proper mode of abstracting blood in the first instance: when, on the other hand, we wish to promote or restore suppressed secretions in plethoric persons, local bleeding by leeches is the best measure. After the plethora has been reduced by one or more general bleedings, local bleeding may often be employed with advantage.

Various medicines have been used in hemoptysis from a belief in their specific powers in checking hemorrhage: (see article *HEMOPTYSIS*.) When the circulation is excited, and more especially when there is reason to apprehend pulmonary inflammation, tartarized antimony combined with nitre forms one of



the most efficient remedies; it is recommended by Dr. Cheyne as superior to all others "in cases of hemoptysis with inflammatory symptoms." It may be given to produce nausea: a quarter or often an eighth of a grain with five to ten grains of nitre every hour will generally prove sufficient to abate the increased action of the heart and induce some nausea. The other remedies in most estimation for the cure of hemoptysis are digitalis, superacetate of lead, ipecacuan, nitre, sulphuric acid, and opium, which last is often useful when there is much nervous irritation or alarm. We consider purgatives of great utility in pulmonary hemorrhage, which in the consumptive constitution is often connected with hepatic congestion; and accordingly we have found that the hemorrhage did not generally cease till the biliary secretion assumed the natural appearance; hence in all cases of hemoptysis we would recommend attention to the functions of the liver. Aperients of the least irritating kind deserve the preference; the saline laxatives generally answer best.

After bleeding and other means have checked hemoptysis, there is some danger of inflammation supervening; and a blister will be beneficial in preventing this. Even during the continuance of the bleeding, blisters are often useful. We consider the application of cold water or ice to the chest a very doubtful measure; and the cold affusion over the whole body, which has been recommended, highly objectionable. Ice, or iced water, may be given internally with advantage. When the hemorrhage has been great and the patient's strength is much reduced, mild tonics may be employed with benefit as soon as the hemorrhage has ceased. Bark with sulphuric acid we consider the best tonic in such cases: in the slighter forms of hemoptysis, the preparations of iron are good remedies.

The cure of pulmonary hemorrhage in persons threatened with phthisis, is not merely to be considered as the removal of a symptom; it may be the means of preventing the occurrence of phthisis, if advantage is taken of the removal of pulmonary congestion to adopt such measures as shall prevent its return, and at the same time improve the general health; the means by which this may be best effected have been already pointed out. It is particularly necessary to watch the state of the pulmonary circulation after an attack of hemoptysis; and when congestion of the lungs is indicated, a small bleeding, employed in season, may prevent a return of the hemoptysis.

*Pain of chest.*—The pain which occurs during the progress of phthisis is seldom very severe, unless when it is complicated with acute pleuritic inflammation. The abstraction of a few ounces of blood by cupping, or the application of leeches or a blister, will generally be sufficient to remove it; but of all local applications we have found the mustard poultice most convenient and effective in relieving the pains which accompany the latter stages of phthisis. In persons with a very irritable state of skin, we find a warm poultice

of linseed meal with a very small proportion of mustard have considerable effect in mitigating pain without exciting much external irritation. When the pain is fixed, a plaister of burgundy pitch applied over the part will be very useful; and in slight pains, friction with stimulating or opiate liniments, or the application of æther, will often relieve them.

*Dyspnoea.*—Severe dyspnoea, except during the last weeks of the disease, is not productive of much distress. During the paroxysms which occur at this period, a combination of æther and opium often proves useful; and if they are very harassing and the pulse admits of depletion, a small quantity of blood may be abstracted with advantage. Laennec recommends belladonna in these cases, but we have never seen it produce decided relief; we have found the extract of stramonium, given in small doses of a quarter or a half a grain every day in cases where the dyspnoea was constant, a far more efficacious remedy.

External applications are sometimes beneficial, particularly when the dyspnoea returns in paroxysms; a mustard poultice is quickest in its operation, and may be applied either to the chest, arms, or feet. When the stomach is loaded, an emetic will afford more relief than any other remedy: the inhalation of æther, either alone or combined in solution with some narcotic substance, is also occasionally useful; but in the last stage of the disease, when the oppression of breathing often becomes very distressing, especially towards night, we have found opium and æther afford more effectual relief than any other remedy.

*Nausea and vomiting.*—In a small proportion of phthisical cases, this forms a very distressing and obstinate symptom. Indeed there is no symptom more difficult of relief than the extreme irritability of the stomach which occasionally accompanies phthisis: we have known it prevail for years, the quantity of food retained during the whole of that period being wonderfully small. All the cases of this affection which we have seen, have occurred in young females of a strongly marked tuberculous constitution. A strict adherence to a mild diet, the avoidance of everything which is found by experience to irritate the stomach, and the use of food in the smallest possible quantity at a time, will often relieve the vomiting or reduce its frequency. In some cases we have derived decided benefit from the use of prussic acid, and in others from lime-water or liquor potassæ. Seltzer water is also occasionally useful. External remedies, such as blisters and sinapisms, produce temporary relief only.

*Hectic fever.*—When this symptom occurs in the early stages of phthisis, and especially when it is accompanied with pain or tightness of the chest, it may be necessary to have recourse to venesection; but in general small doses of tartarized antimony combined with nitre or saline medicines will be the most effectual remedies. When the hot stage is strong, sponging the hands and feet with tepid vinegar and water will afford relief; but the cold fit frequently forms the principal and most dis-

treassing part of the febrile paroxysm. Bark occasionally relieves this stage, although its effects are generally temporary. When the chill comes on at a particular hour of the day, its severity may often be abated by keeping the patient warmly covered in bed till the paroxysm has passed. But the best means of controlling the hectic fever is a well regulated diet.

**Perspirations.**—The copious perspirations of the consumptive patient during sleep form one of his most distressing symptoms during the advanced stages of the disease.

In many cases medicine has little power in diminishing these perspirations. Sulphuric acid is commonly used for this purpose; and when the debility is great, and there are no objections to its exhibition, much advantage will be derived from a combination of the acid with an infusion of bark, or with small doses of sulphate of quinine; small quantities of this medicine being much more beneficial as a tonic than the larger doses. When there are objections to the bark, infusion of sage may be advantageously combined with the acid; and acetic acid may sometimes be substituted for the sulphuric. Fouquier thinks that acetate of lead possesses a specific effect in diminishing night-sweats; the dose in which he usually gave it was from four to eight grains, increased even to twelve grains a day. We have seen the expectoration diminish under the influence of this remedy, but we have not used it much in perspirations. The most effectual plan of moderating the perspiration consists in regulating the patient's diet, which should be mild and moderate; and much warm fluid, particularly towards night, should be avoided. When the perspirations are very copious, the patient should sleep in flannel or calico; and it is often necessary, and at all times a great comfort to him, to be wiped with warm flannels, and to have his clothes changed frequently.

**Diarrhœa.**—Although the bowels are frequently irritable and easily deranged during the whole progress of phthisis, diarrhœa in general does not occur in a severe degree till an advanced period of the disease: the expectoration is generally abundant, and the perspirations are copious before it appears.

In the earlier stages diarrhœa often depends on an irritated and loaded state of the alimentary canal, produced by errors in diet or other causes. This will be remedied by gentle aperients, such as rhubarb combined with carbonate of soda; or when the stomach is much oppressed, an emetic may be preferable: and a strict attention to regimen will very generally prevent its return under such circumstances. But when the diarrhœa depends on ulcerated bowels, which happens in a large proportion of cases, as we have already shown, it becomes of course very obstinate, and stimulants and rough astringents aggravate and increase it; while a mild diet, consisting chiefly of farinaceous food, such as rice, arrow-root, and sago, soups, milk, and light animal food, diminish it and even prolong the patient's life. It is not sufficiently considered that the diarrhœa of the latter stages of phthisis depends upon diseased

bowels; and that the almost constant existence of internal ulcerations forbids the practice of loading the stomach with large quantities of chalk mixture, kino, catechu, and stimulating aromatics and exciting food, but rather calls for the employment of a mild regimen and soothing medicines. Ipecacuan in combination with some mild narcotic, or with the compound ipecacuan powder, forms a very useful medicine; sulphate of copper is also occasionally useful; and an enema of starch and opium frequently suspends the diarrhœa for a considerable time, and produces sleep more effectually than any other remedy.

External applications, such as stimulating and opiate liniments, will often give relief to the uneasy sensation in the bowels which sometimes remains long after an evacuation.

**Complications.**—The treatment of the various diseases which complicate phthisis in its progress, such as laryngeal irritation, bronchial inflammation, catarrh, pneumonia, &c. does not differ from that usually employed in those diseases; and we refer for full particulars respecting it to the articles under those heads. It must, however, be kept in mind, in treating all the intercurrent diseases which attend phthisis, that they are merely complications, and require cautious treatment in proportion to the advanced state of the tuberculous disease and the debility of the patient.

**IV. Treatment of the advanced stage.**—As phthisis advances, the case becomes more complicated, and consequently the treatment requires to be more varied. The extension of the tuberculous disease in the respiratory organs renders them less capable of performing their functions: the pulmonary circulation is carried on with increasing difficulty, the lungs are more subject to congestion and inflammation, and hence the increase of cough, dyspnœa, and pain,—symptoms which generally become more urgent with the progress of the disease. With the extension of the local disease, the hectic fever, and especially the perspirations, increase; the digestive organs, partly from sympathy, but more from the advance of tuberculous disease, become deranged; and nausea, vomiting, and still more frequently diarrhœa, add greatly to the patient's sufferings. According to the predominance of one or more of these symptoms, must the means of relief be varied: hence the treatment of the advanced stages resolves itself chiefly into the treatment of particular symptoms, which has been considered in the last section. We would only observe that the patient's life may be prolonged, and the remaining term of his existence deprived of much of its discomfort and distress by observing a strict adherence to a mild regimen, avoiding whatever excites the circulation or irritates the digestive organs. If these precautions are neglected, the hectic fever, the perspirations, and the diarrhœa will be increased; the patient's mind also becomes irritable under an exciting regimen, and he is fretful and impatient under his sufferings; a circumstance which adds not a little to his own uneasiness, and is moreover most painful to the feelings of

those around him: hence the great object of our treatment should be to soothe and tranquillize both mind and body.

V. *Regimen*.—The great difficulty of directing the regimen of persons of a tuberculous constitution depends upon the discrepancy which exists between the wants of the system and the powers of the digestive organs. The former appears to call for a strongly tonic diet; while its employment never fails to aggravate the weak and irritable condition of the latter, and depress still further the powers of the constitution: hence it is evident that the food which is best adapted to the digestive organs, is that which will ultimately contribute most effectually to the strength of the system. A disregard to this obvious law of the economy has given rise to the great diversity of opinion which still prevails respecting the regimen of tuberculous patients. We have already stated our opinion regarding the diet of children, and alluded to the prevailing error of over-feeding young persons of the strumous constitution. Large joints of the strongest and most exciting kinds of animal food frequently constitute their diet, whether their stomachs are strong or weak, irritable or otherwise; the delicate puny girl of seven years of age has the same dinner as the robust lad of seventeen, and both are generally fed upon a kind of meat which is adapted only to persons of adult age and matured strength, who take active exercise the greater part of the day in the open air.

During the early stage of phthisis the diet ought to be mild, and in cases where there is a tendency to pulmonary congestion it should be strictly antiphlogistic; but the diversity of the prevailing symptoms renders it impossible to lay down any general rule on the subject. We would simply remark that when, from any cause, it is necessary to reduce the diet, its subsequent increase should be made with great caution and very gradually.

As phthisis advances, the diet must be regulated according to the circumstances of each case: one person will bear and derive advantage from a diet that would excite fever in another; and, therefore, any general rule that could be laid down on this subject would be weakened by so many exceptions that it would be useless. Too much importance is attached to the food, and too little to the state of the digestive organs; and hence it is most erroneously supposed that the emaciation and wasting of the patient may be checked by an additional quantity and richer quality of food; by which means derangement of the digestive organs is induced along with a new train of symptoms, which tend to complicate the case and add to the distress of the patient.

Although a mild diet is that which is most generally suited to the advanced stages of phthisis, cases may occur in which it is advisable to adopt a more exciting regimen; and instances are on record where the consumptive patient, after long lingering under a spare diet, has rapidly improved in strength and been apparently cured by a diet of an opposite quality.

That this has occurred we do not doubt; but the patient has probably been as much indebted to the mild diet as to that which followed it. The patients who have been cured in this manner have no doubt been persons in whom the tuberculous disease of the lungs was limited, and advancing to a cure before the change of regimen was adopted. In many such cases, however, a change from a mild to a stimulating diet would do mischief, and interfere with the curative process going on in the lungs; indeed the proportion of cases is very small in which it will prove useful, and even then much judgment and discernment will be necessary on the part of the practitioner in deciding on the proper period for its employment. When such a change of diet is made, it should generally be accompanied by an increase of exercise in the open air: Salvadori combined his salt meat and generous wines with exercise on horseback, and promoted perspiration artificially by placing his patients near the fire.

The cases that are likely to be cured by the stimulating plan of treatment,—by beef steaks and porter,—bear so small a proportion to the many that will be injured by it, that we do not consider it deserving of further notice in this place. Many more patients have been preserved by the early adoption of a milk and vegetable diet with a residence in the country; and there are numerous instances in which this regimen, adopted in the very commencement of tuberculous disease, proves more suitable than any other. The jelly of some of the mosses has been recommended as a nutritious article of diet for the cure of consumption; of these the Iceland moss jelly has been generally preferred: it forms a light form of nourishment, and its bitter qualities render it useful in some states of the stomach. Asses' milk and goats' whey are well known articles of diet in such cases; but on this part of our subject it is unnecessary to go into detail in this work.

In bringing this article to a conclusion, we feel that, although we have exceeded the limits which we had originally assigned to it, the subject, in the extended view which we have taken of it, is one of such deep interest—involves so many important considerations—and embraces so wide a range, that we may have omitted some things, and passed lightly over others; but we believe that we shall be found to have attached its due value to every point which is of real consequence. If, in the accomplishment of our object, we have dwelt more particularly on some parts than on others, we have been induced to do so from a full conviction of their paramount importance. Our great aim has been to point out the sources of tuberculous diseases, and to impress upon our medical brethren the necessity of directing their chief attention to the origin and causes of phthisis,—a knowledge of which can alone lead to the means of preventing that disease, and of diminishing the frequency of tuberculous diseases generally.





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